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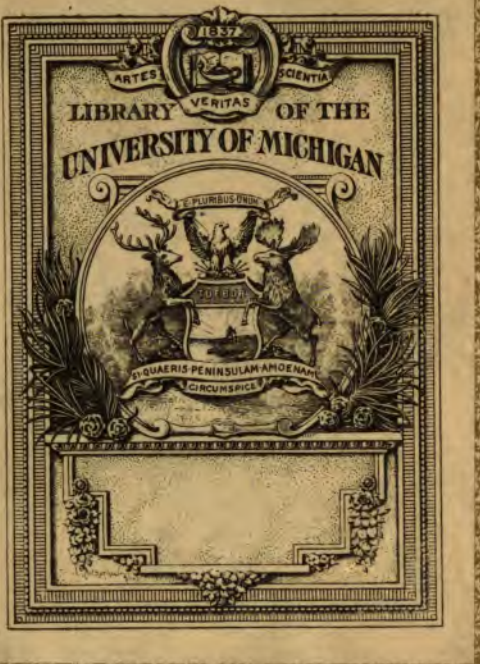

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MEDICAL AND SURGICAL

DISEASES

OF THE

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KIDNEYS AND URETERS

BY

BUKK G. CARLETON, M. D.

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IN APPRECIATION OF THE CONSIDERATION AND MANY ADVANTAGES ENJOYED BY THE AUTHOR DURING HIS TWENTY-ONE YEARS' CONNECTION WITH THE HOSPITAL,

THIS LITTLE VOLUME

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PREFACE.

MANY professional friends have requested me to prepare and publish a practical working companion volume to my Manual on Genito-Urinary and Venereal Diseases, so as to complete the subject of the Uropoietic diseases. In accordance with their request this monograph on the Medical and Surgical Diseases of the Kidneys and Ureters has been written and is now presented to the medical profession.

It has been the aim of the author to incorporate all new facts from reliable sources together with his personal experience obtained at the Metropolitan Hospital and in private practice. Theories have been omitted and established facts only presented.

The treatment of each disease, medical and surgical, is fully considered.

As only brief drug indications have been given in the treatment of the different diseases described, Chapter XL. must therefore be consulted when more complete symptomatic and clinical indications are required.

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The author is greatly indebted to Dr. E. D. Klots, Curator of the Metropolitan Hospital, for valuable assistance in the preparation of the sections on pathological anatomy and for the photomicrographic plates demonstrating pathological changes, and to Dr. R. du Jardin for his assistance in seeing the manuscript through the press.

BUKK G. CARLETON.

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MEDICAL AND SURGICAL DISEASES OF THE KIDNEYS AND URETERS.

CHAPTER I.

Malformations of the Kidneys and Ureters.

From a surgical, if not from a medical standpoint, the possibilities of malformation of the kidney, the absence of either, or a supernumerary kidney, should always be considered.

Congenital absence of one kidney is not the rare condition it was once thought to be. The left is most frequently absent, but within the past two years three cases of congenital absence of the right kidney have been reported to the N. Y. Pathological Society.

Congenital absence of one kidney occurs in about one in every four thousand persons.

Where one kidney only is present, it will be found enlarged, and is usually fully competent to secrete the urine of the body, and presents no clinical symptoms. When one kidney has been removed, compensatory hypertrophy, with increase in function, occurs in the remaining organ.

Whenever a nephrectomy is proposed, the presence of both kidneys should be made sure of, not only by palpation and percussion of the kidney region, but also by cystoscopic examination, together with catheterization of the ureters.

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Sometimes the kidneys are connected by a band of tissue extending between their lower ends, giving a horseshoe appearance, with the concavity looking upwards; this is caused by dislocation and early amalgamation of the embryonic points of origin. The ureters in this case usually pass to the bladder in front of the connecting band; they may pass behind, or may evencross one another. Less frequently the kidneys are connected at their upper extremities.

Cases have also been reported where the kidneys were joined together and placed in front of the great vessels in the lumbar region; one has been found to occupy the usual position, the other being placed over the sacro-iliac synchondrosis, or between the bifurcation of the aorta; there may be a double lobulated kidney on one side.—Dr. G. A. Tuttle presented a kidney at the N. Y. Pathological Society on April 8, 1896, which he had removed from the hollow of the sacrum, its renal artery being given off close to the origin of the sacro-median artery.

Entire absence of the kidney tissue has not infrequently been observed in the newly born.

There is usually one ureter connecting each kidney with the corresponding side of the bladder, but cases are frequent where there are two or more ureters leaving the pelvis of the kidney, joining usually about one or two inches from their origin to empty by a common ureter into the bladder.

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Double ureters are usually found in kidneys having two pelves.

In the female the ureter has been known to open at or near the meatus urinarius giving rise to continuous incontinence. In these cases the ureter, instead of opening into the bladder, was found to be continued between the septum of the bladder and vagina opening externally, as in the case reported by Dr. F. H. Davenport, Trans.-Am.-Gynæcological Society, 1890, and Dr. Baker, N. Y. Med. Journal, 1878. Mr. Davis Colby, in the Path. Society, London, Vol. XXX., reports a case where the ureter on the left side was continued through the bladder and urethra, opening at the meatus urinarius. It is not uncommon to find the ureters greatly dilated, sometimes even to the calibre of the small intestines, caused by obstruction from below. In some cases, where there is marked contraction or obliteration of the bladder, the dilated ureter acts as a bladder or reservoir for the urine. There are cases in which dilatation has been found in children and which must be considered congenital, as no obstruction was discovered at the autopsy.

In regard to the vessels, it is not uncommon for the renal artery to enter the kidney at the pelvis by a number of branches or at the side, or on the convexity of the organ.

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CHAPTER II.

Nephroptosis.

Floating and movable kidneys differ in the fact that the floating kidney is congenital, has a complete meso-nephron, and is attached to the posterior wall of the abdominal cavity by an extensive band of connective tissue, allowing of great latitude of motion. The movable kidney is an acquired condition, due to traumatic relaxation from the abdominal parietes, to absorption of the peri-renal adipose tissue which holds the kidney to the posterior abdominal wall, or anything that interferes with balance of force exerted upon the kidney from above, downward and backward, and from below upward and backward, forcing the kidney backward against the posterior abdominal wall by their wedge-like power. The movable kidney may become so loose as to allow of almost, if not quite, as much mobility as in the floating variety. As these conditions present similar symptoms, and may require the same treatment, they will be described together.

Etiology.—The floating kidney is always congenital, while the movable is acquired. Increased mobility of the kidney is the result of various forms of traumatism. The researches of His and Cunningham give a clear description of the normal anchorage of the

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kidney, and the causes which engender an excessive mobility. The kidneys are pressed back into their place by two forces — one from above pressing the kidney downward and backward, and one from below pressing it upward and backward—the wedge-like backward pressure keeping the kidney in its normal position. The effect of this pressure can be seen on kidneys that have not undergone post-mortem or ante-mortem change from position of the body or disease—the anterior surface of the kidney appears prominent transversely at its centre, and falls off on an inclined plane towards its superior and inferior extremities. This wedge-like pressure is produced on the right side from above by the liver, on the lower by the colon; on the left side it is produced from above by the suprarenal capsule, stomach and spleen, and on the lower by the intestines, which press upwards and backwards. On the right side, as the liver, kidney and colon move together during respiration and bodily position, the relative forces are usually about the same, but on the left side there is a greater degree of mobility, due to the varying condition of the intestines — the upward and backward pressure being less when the intestines are empty, and greater when they are distended with gas—the general pressure upward and backward upon both kidneys is generally maintained, but the lower force is the weaker, consequently anything which deminishes the upward and backward pressure will

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be a factor in the production of, or will cause a movable kidney. Childbirth is undoubtedly the most frequent cause of a displaced kidney, some authorities claiming that one in every six or seven women who have borne children suffer from this condition. The majority of recorded cases occur between the twenty-fifth and thirty-fifth year, yet Dr. W. W. Stewart, in the Medical Record, Feb. 9th, 1895, reports a case occurring in an infant of eight months. Edebohls, in a report of twenty-two consecutive cases, found fifteen in unmarried and seven in married women. Other authorities believe that corsets are the most frequent cause, but this has been largely disproven by the fact that German women of the lower classes, who never wear corsets, are especially prone to this condition. Falls and injuries, and the lifting of heavy weights, sometimes appear to be the exciting cause. Rapid absorption of the connective tissue surrounding the kidney in acute or chronic wasting disease, or the acute over-distention of the kidney, with rapid reduction of its volume, as in acute hydronephrosis, etc., often produce this condition. The faulty position of the body in sitting or standing, as well as an improper mode of dressing, are believed to be predisposing factors. It is almost seven times as frequent in the female as in the male, that is, according to the statistics, but as physical examination becomes more complete, we will probably not find the ratio of difference so large. The right

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kidney is usually the one to be dislocated or movable, and is believed by some to be due to the downward pressure of the liver. In a few reported cases both kidneys have been movable.

Clinical History.—The movable is usually much more painful than the floating kidney, and is said to be fifty times as frequent in occurrence. In many cases no unpleasant symptoms are perceived, and the condition passes unnoticed only to be revealed at the autopsy, or accidentally discovered by the patient when the fear of a tumor of some kind necessitates medical advice, and the nature of the condition is thus revealed. These probably constitute the larger class.

In the second class there is a sensation of something wrong or loose within the abdominal cavity, accompanied by flatulence, nausea and possibly vomiting, palpitation of the heart, also obscure gastro-intestinal and nervous phenomena, with varied mental symptoms, melancholia, etc. There is transitory or continuous pain, which at times is excruciating, in the region of the involved kidney, extending into the labia in the female, the testis in the male, down the groin and along the course of the anterior crural nerve.

In the third class, when the pedicle is long and the kidney excessively movable, the ureter and its associated vessels may become temporarily twisted or strangulated, causing agonizing pain, vomiting, distention of the abdomen, collapse, etc., a condition known as

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Deith's or the renal crisis, which is due to the torsion and pressure on the vessels and nerves of the cord, and over-distention of the ureter and pelvis of the kidney by retained urine The torsion, however, soon rights itself by over-distention of the ureter, and the symptoms disappear, though in many cases it causes a hydro- or pyonephrosis.

As a rule, there are no urinary symptoms of special importance, except those of a resulting acute hydronephrosis—*i. e.*, small quantity of urine passed during an attack, followed later by the passage of a much larger quantity of light color. Before and during an attack of renal crisis there is frequent and sometimes painful urination.

The nervous symptoms are legion, being largely the reflex manifestations found in various uterine diseases:—nervous irritability, hysteria, hypochondriasis, melancholia, etc. In some cases the nervous condition becomes so pronounced as to result in hallucination of sight, hearing, and even insanity. Sleep is disturbed or absent, many find it impossible to lay on the left side. The reason for these reflexes is, as yet, unknown. Edebohls believes that these nervous reflexes, as well as many of the digestive symptoms, are due to pressure upon the great solar plexus of the sympathetic nervous system. Changes in the circulation, and an almost cyanotic condition, accompanied by a sensation of constriction in various parts of the body, are often noticed. With these circulatory changes there is frequently great pain in the hands and fingers.

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The stomach and duodenum are frequently dislocated and distended with gas. Pain, often burning in character, is quite constant and may be felt in the region of the kidney, or more frequently along the free border of the ribs of the corresponding side. The mouth may be ulcerated, the gums spongy, and the tongue thick, red and sore, showing the imprint of the teeth. There may be constipation or alternate diarrhœa and constipation, and at times pieces of membrane or fibrous masses, from one-eighth to two inches in length, are passed with the stool. Patients sometimes complain of a sensation as if something were alive in the abdomen.

On inspection, the lumbar region over the movable kidney is found to be somewhat hollowed, and may be tympanitic instead of flat on percussion. The kidney may appear as a tumor, resembling in form a normal kidney, below the free ribs on the anterior portion of the abdomen, in the umbilical region, or even across the centre of the abdomen. This tumor slips easily from beneath the fingers, and if the patient assumes the dorsal position, it can usually be replaced in its normal position, and the tympanitis in the lumbar renal region will then give place to flatness on percussion. It should, however, be remembered that the normal kidney has a range of motion of three-fourths to one inch in a vertical direction, and that the term movable kidney can only be applied when it exceeds

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this limit of mobility. In the very fat it is sometimes impossible to make a diagnosis by the physical signs.

The pain and the nervous and dyspeptic symptoms caused by a movable or floating kidney, have frequently been attributed to a diseased ovary and that innocent organ has been removed without cause and without relief to the unhappy patient.

In the female, the symptoms are all worse during the menstrual period and during the first one or two months of pregnancy, due to the heavy and prolapsed uterus dragging down the kidney and other abdominal organs. When pregnancy advances or tumors develop, pushing up the abdominal viscera, relief from the symptoms frequently occurs.

The clinical history varies somewhat with the kidney involved. If it is the right, flatulence, indigestion and vomiting will be prominent symptoms. The indigestion will not depend upon the character of food taken, and the pain accompanying it usually appears about two hours after eating. The pain and disturbed digestion is caused by a mechanical kinking in the duodenum from the sagging of the displaced kidney when the connecting band of tissue is firm; when it is loose the symptoms may be very slight. These gastric crises resemble those occurring in stricture of the pyloric end of the stomach and differ greatly from the renal crisis caused by the twisting of the ureters. When the left kidney is involved, the

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gastric symptoms are absent and constipation becomes a prominent symptom.

In a paper on this subject, Dr. A. H. Cordier, Medical Record, 1896, draws the following deductions: (1) A movable kidney often produces a dilatation of the stomach with all the accompanying symptoms of disease of that organ. (2) It is a fruitful source of gall-stones, because of the pedicle producing a partial obstruction of the common duct. (3) The bending of the ureter often gives rise to hydronephrosis; this, in turn, is sometimes converted into pyonephrosis. (4) It may produce death by strangulation from torsion of the vessels and ureter. (5) By dragging on the abdominal aorta and kinking the vena cava, a condition simulating an aneurism of the vessels may be produced. (6) Pain, which is referred to the region of distribution of the spinal nerves, is often induced by a movable kidney through disturbance of the abdominal brain. (7) General nerve exhaustion often results from interference with digestion, assimilation and elimination.

Diagnosis.—When examining for a movable kidney, three positions are recommended. First: The patient is placed in the dorsal position with the shoulders elevated, thighs flexed upon the abdomen and requested to make deep inspirations and expirations to relax the abdominal muscles. The hand is then placed underneath the hollow of the loin, and just between the last rib and the crest of the ilium, the thumb encircling the abdomen immediately below the

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costal arch but without exercising any pressure. As expiration is about to commence, the thumb is pressed upward beneath the costal arch and as deeply as possible toward the kidney, at the same time the kidney is brought forward by the pressure of the fingers from behind. If the patient is not too fleshy, a dislocated kidney may be made out by placing the other hand below the thumb and its abnormal mobility demonstrated. When the kidney lies entirely below the grasp of the hand we have a movable kidney. As the grasp is relaxed, the kidney is liable to slip easily from the hand into its normal position. Deep pressure frequently causes a sickening nauseated feeling. A kidney that descends only so that its lower half can be felt on inspiration and recedes with expiration, must be considered as physiologically movable. If the mobility cannot be determined in the dorsal position, the patient should recline on the side opposite the kidney to be examined—then, with bimanual examination and deep inspiration, as above, the diagnosis can usually be made. These methods, however, are objectionable, as the bodily position facilitates the return of the kidney to its normal position, and, in those who are very fleshy, it is impossible, or very difficult, to grasp the kidney between the hands. When, however, the patient stands with the shoulders bent forward, the kidney will be strongly displaced and can usually be mapped out with the finger as it presses against the abdominal wall.

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This condition must be differentiated from growths in the mesentery, from the pancreas, a wandering spleen, a diseased gall-bladder or ovary. These can usually be eliminated by their clinical history. The enlarged gall-bladder, when movable, moves in a circle, and, when distended with gall-stones, is harder and more tense than a movable kidney; the accompanying jaundice will assist in the diagnosis, although an exploratory incision is sometimes required to make it clear.

TREATMENT.—Do not neglect the administration of the indicated remedy simply because you have a surgical condition to deal with; but do not rely on drugs alone; the parts at the same time must be restored to their normal position and properly supported. The remedies most frequently indicated are: Strychnia arseniate, Pulsatilla, Sulphur, Ignatia, Gelsemium and Lachesis. In acute cases replace the kidney. Rest in the dorsal position, hot fomentations, hot baths, and sometimes, in the renal crisis morphia may be required.

There are four methods of treating chronic cases: First, rest, and if this treatment is to be followed, it means absolute rest—no carriage, bicycle or train rides; no walking, climbing, jumping, dancing, etc. Few patients, however, can afford absosolute rest. Next in order comes the use of a proper belt or bandage. Newman uses a rubber pad which can be inflated after adjustment. Others use elastic webbing, applied so as to completely surround

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the abdomen. This acts well in the male and in females who are free from uterine disorders. A simple, broad bandage, with a broad pad, sometimes acts very satisfactorily. A tight corset or a spring truss, furnished with a large pad, to compress and push upwards the lower part of the abdomen, have also been advised. Of the various kinds of supports, the best satisfaction has been given by a silk elastic abdominal belt, with perineal straps to retain it in position, as advised by Dr. W. W. Stewart, in the Medical Record, Feb. 9, 1895, and made by Pomeroy & Co. In some cases a pad of horse-hair or wool, covered with kid, and placed just below the kidney, is required.

The greatest care is necessary in taking the measurements from which the belt is to be made. These measurements are to be taken at eight distinct points, as per Figure 1. The patient should stand squarely

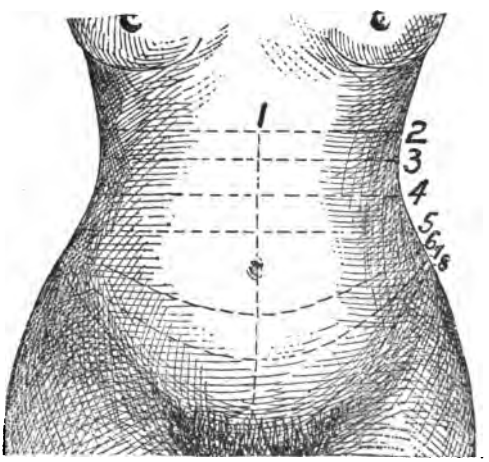

FIG. 1.

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on the feet while measurements are being taken, and the tape should be drawn uncomfortably tight at each point. The belt should always extend as high as the last rib and fit snugly.

Dr. S. A. Newhall, in the Kansas City Medical Arena, records a case cured by Faradism, one pole being applied in the vagina and the other over the kidney region. The current was used daily, and after the third application the kidney returned to its normal position and remained there. The treatment was continued daily for two weeks, and then every second day for two weeks longer. In many cases excellent results are obtained with Faradism, combined with a proper abdominal bandage and the usual hygienic restrictions. When these means are not successful, and the kidney is healthy, a nephrorrhaphy must be performed, and the movable or floating kidney fixed to the posterior wall of the abdomen; if it is diseased, the organ must be removed (see nephrorrhaphy-nephrotomy). Bruce Clark says that movable kidneys tend to the development of calculous deposits in the pelvis of the kidney, interstitial nephritis, etc.; when the operation to immobilize the kidney is delayed too long, he advises an early operation. Osler says that the operation is not always successful.

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CHAPTER III.

Uræmia.

Foster defines this condition as "a poisoned state "of the blood, due to defective elimination of the "elements of the urine, in consequence of impair- "ment of the functional capability of the kidneys, or, "by their re-absorption in the cases of retention of "urine, characterized by stupor and, especially in "lying-in women, by convulsions."

Etiology.—When the condition that we now recognize as uræmia was classified, it was supposed to be due to the retention or an excess of urea in the blood, but as experiments multiplied, it was found that uræmic symptoms were sometimes present when the blood contained no urea, although if urea were introduced either directly into the blood current, or indirectly through the stomach, and the ureters tied, or no fluids ingested, many symptoms of uræmia soon appeared. It has further been found that many cases of complete anuria were not followed by uræmia. This and other facts lead to the rejection of this theory, and the advancement of the idea that uræmia only occurred when the urea in the blood was in some manner decomposed into the Carbonate of Ammonia by a peculiar organized ferment; but in the light of modern investigation, this theory, like the

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one that it was produced by the excretory products, Creatin, Creatinin, Leucin and Tyrosin proved fallacious. Then followed the theory of Traube that the condition was the result of cardiac hypertrophy, hydræmic conditions of the blood, and cerebral œdema, but this, too, was found to be fallacious, or not true in all cases. The Jour. de Méd. et de Chir. Pratique, July 10, 1895, says that uræmia is caused by the following conditions, which may be considered to be the opinion of the day: "First, a dominating toxic element, caused by the failure of the diseased kidney to perform satisfactory elimination of the débris of the organism. Second, a mechanical factor, cerebral anæmia, the localization of which in the motor zones may cause convulsions, either general or limited to one side, to one member or merely to several facial muscles. In some cases the uræmia presents an apoplectic form, in others it is hemiplegic, both dependent, however, upon cerebral anæmia." The writer further remarks that many cases of hemiplegia, usually supposed to be due to cerebral hemorrhage or softening, in which the autopsy shows no evidences of disease or extravasation of blood into the cerebral tissue, are due to this cerebral œdema, which disappears on the death of the subject. We must, therefore, await further research, believing it to be due to some deficiency of elimination of certain unrecognized elements, and content ourselves with a description of the effects, the remedial treatment, and the physiological methods at our command to relieve or prevent them.

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HEADACHE is one of the early symptoms of this condition, which we call uræmia. It may be mild, severe, transitory or continuous; in some cases it is so intense and protracted as to cause sleeplessness. In the acute forms of nephritis it is accompanied by arterial tension and diminished secretion of urine. In the chronic form the urine is often diminished, the specific gravity low and the arterial tension is not constant.

URÆMIC AMAUROSIS.—Sudden blindness, not due to retinitis albuminuria, is sometimes developed during the puerperal state, and in chronic nephritis. The cause of this symptom is unknown. It may last for hours or days, and may precede or follow convulsions; it is sometimes accompanied by uræmic deafness.

CONTRACTIONS OF SINGLE MUSCLES or groups of muscles sometimes occur in the more severe cases of uræmia, and are usually the forerunner of the approaching convulsion.

CONVULSIONS.—Their appearance is usually sudden; there may be one or many, and they may follow each other at intervals of minutes or hours. They may be epileptiform in character or assume the Jacksonian type. Consciousness may return between the attacks or the patient may remain in a state of coma; convulsions may develop in mild as well as in the more severe cases of acute nephritis, and may be expected when the urine is diminished or suppressed with marked arterial tension. In these, recovery is the rule. When occurring in chronic interstitial nephritis

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and in the puerperal state, developing before, during, or after labor, accompanied with the same arterial tension and urinary symptoms as inacute nephritis, the termination is more likely to be fatal.

DELIRIUM AND COMA may appear in uræmic conditions. These, with convulsions, may develop slowly or rapidly during the course of Bright's disease, especially in the acute and in the exacerbations of chronic nephritis. The coma may be continuous, progressive or transitory. The face may be pale or flushed; the pupils dilated, contracted or normal. The breathing is often hissing in character, and is noticed in the more severe forms of Bright's disease.

APHASIA of uræmic origin has been noticed by Rendu, Guyot and others. Rendu's case in the Hospital Necker seems to prove that the uræmic toxine may be limited to a particular area of cerebral tissue or a general involvement, as was originally maintained.

INSANITY frequently develops and is often overlooked; it occurs especially in chronic interstial nephritis. The patient is restless, sleepless, talkative and noisy.

TEMPERATURE.—In chronic Bright's, when the headache, coma, convulsions, delirium, etc., become marked, there is usually a corresponding rise of temperature, the thermometer sometimes registers 108° to 109° F. In acute cases a temperature of 103° or 104° F. for the first week is not uncommon.

ARTERIAL TENSION.—This is one of the most frequent and grave phenomena noticed in uræmic con-

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ditions; it accompanies most of the severe manifestations. When the uræmic conditions are prolonged, hypertrophy of the muscular coat of the arteries may develop, but the principal cause of the tension is undoubtedly due to irritation of the inner coat of the arteries by some toxic substance or substances in the blood which the kidney has failed to eliminate.

Dyspnœa in Bright's disease may arise from many causes: From an accumulation of fluid in the pleural or abdominal cavities, œdema of the lungs, accumulation of bronchial secretions, etc., but the true uræmic dyspnœa is from another cause, *i. e.*, irritation and consequent poisoning of the respiratory centers from a substance contained in the circulation. This condition comes on insidiously—it is usually first noticed in the morning or after some unusual mental or physical exertion. At first the attacks of dyspnœa are transitory and are frequently the first symptom to indicate the presence of chronic Bright's disease. As the disease progresses the attacks appear at more frequent intervals and are of longer duration. The patient is unable to lie down and rales are absent in the bronchial tubes; this physicial sign differentiates it from bronchial asthma. After a time this condition becomes continuous and agonizing, the Cheyne-Stokes respiration may be present, and death finally releases the sufferer from his misery.

Digestive Disturbances.—The breath frequently has the odor of urine. Vomiting may occur in both the acute and chronic forms of Bright's disease. In

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acute cases it may be caused either by the urea in the circulation or the hyperpyrexia. In the more chronic form it may be distressing, sometimes lasting for days. The vomiting is especially noticeable in the morning, after taking food; is usually accompanied by increased arterial tension, and is very exhausting and may terminate fatally. Diarrhœa sometimes occurs.

Uræmic Pruritus, formication, numbness and pain in the joints, simulating rheumatism, are occasionally complained of.

Diagnosis.—In cases of doubt, the diagnosis will always depend on the urinary analysis. When the patient is unconscious, he must be catheterized and the urine examined without delay. The symptoms of nephritis, objective and subjective, are usually all-sufficient to make a diagnosis, yet it is sometimes impossible to differentiate the cerebral conditions from cerebral hemorrhage, tumors and meningitis. All objective symptoms being equal, if the eyes converge to the same point, the probable diagnosis will be apoplexy, and not uræmic coma. Epileptic convulsions simulate very closely those of uræmia, and albumen may even be present in the urine, but it occurs only during and immediately after an attack, while in uræmia it is persistent. Poisoning by narcotics also simulates uræmic conditions. In opium poisoning the respiration is slow and stertorous. In uræmia it is asthmatic and hissing in character.

Prognosis.—The prognosis is always grave. When

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occurring in acute nephritis, the patient usually recovers. In chronic parenchymatous nephritis it is a symptom of approaching death, though relief may sometimes be given for a considerable period. In chronic interstitial nephritis it indicates impending death.

TREATMENT.—The remedy indicated by the totality of the symptoms.

Acid Carbolic. Great fullness of the cerebral vessels, sensation of a band around the head, headache, vertigo, clonic convulsions, coma, great languor of mind and body.

Acid Hydrocyanic. Uræmic convulsions, with drawing backward of the head, respiration irregular, gasping, great cardiac distress, coldness and blueness of the extremities.

Ammonium carbonicum in the non-reactive state of uræmia, stupid in action, grasping at flocks, face and lips bluish, rattling as of large bubbles in the lungs.

Arsenicum. Uræmia, with great anxiety, restlessness and sinking of the vital forces, with a feeling that it is useless to take medicine and that they are about to die; dyspnœa, either cardiac with palpitation, or due to œdema of the lungs, worse at night and when lying on the back; dyspnœa aggravated on lying down, especially recurring at 12 P. M., and relieved by expectoration.

Cannabis Indicus. Uræmia, with severe headache, sensation as if the vertex was opening and closing, associated with delusion of time and space; objects

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seem a long distance off, forget what they intend to say or do.

Cantharides. Headache, delirium, coma, with suppression of urine. This remedy frequently increases the flow of urine and prevents convulsions.

Cicuta virosa. Convulsions, with twitching of individual muscles.

Cuprum Arsenite. Uræmic convulsions. Goodno considers this remedy in the second or third decimal trituration almost infallible.

Glonoin. Uræmic dyspnœa, uræmic convulsions, frothing at the mouth, pulse full and hard, unconscious, with thumbs clenched into the palms.

Helleborus niger. Blunting of the general sensibilities; pupils dilated and do not react to light, or while seeing do not seem to regard the objects seen; violent pain in the head, especially in the occiput; face swollen and puffy, nausea, vomiting, absence of thirst; convulsions, with cold extremities; urine scanty or suppressed.

Opium. Uræmic coma and convulsions.

For more complete symptomatology and minor remedies see Chapter XL.

At the same time the adoption of physiological means are often imperative. Hot baths are useful and of great benefit. The removal of a portion of the blood, and with it a quantity of urea, with the transfusion of an equal quantity of a saline solution to take its place, has in many cases given immediate relief. One thousand grammes of blood charged

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with urea have in this way been removed, and the balance of the circulation maintained by the saline solution with marked benefit; a rectal injection of two quarts of a hot saline solution has often acted kindly and re-established urinary secretion. These methods are believed to be far more beneficial in uræmic conditions than diaphoretics or cathartics. When profuse sweating is desired, Pilocarpin is admissible only when simple hypertrophy of the heart muscle is present, without other heart complications. It is a heart depressant, and has frequently acted disastrously. Children are proportionately more tolerant of this drug than adults.

When arterial tension is present, most authorities, at the present time, advise the administration of Glonoin, Chloral Hydrate or Morphia, as indicated by their physiological action, to relieve the tension and, for the time being, remove the strain upon the system.

Free purgation has sometimes been of great benefit. When the patient is unconscious, this is best produced by placing a drop of Croton Oil on the finger and applying it to the back of the tongue; when able to take medicine, Elaterium, in $\frac{1}{20}$ to $\frac{1}{8}$ grain doses every four hours, or an ounce of Magnesium Sulphate dissolved in an ounce and a half of water, may be given early in the morning, the patient taking no fluids for twelve hours before it, and not until six hours afterwards, have acted satisfactorily.

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CHAPTER IV.

Acute Congestion of the Kidneys.

ETIOLOGY.—This condition is frequently caused by excessive and unusual exertion, as in baseball and football games, bicycling, mental excitement, and from cold baths or exposure. It may be the result of severe bodily injury, or surgical operations, especially those connected with the genito-urinary system. It is frequently caused by irritant drugs, as Cantharides, Turpentine, Ether, Chloroform, etc., when ingested, inhaled as vapors, during their elimination, or following their local application to various parts of the body.

PATHOLOGICAL ANATOMY.—There is no change in the structure of the kidney. The blood vessels are more or less engorged, depending upon the severity of the attack.

There may be an exudation of serum and leucocytes, or diapedesis of red blood cells into the tubes and glomeruli.

Upon recovery the kidneys return to their normal condition.

CLINICAL HISTORY.—In itself it is of importance as being part of or accompanying some other condition. This disease is usually transitory and soon subsides. It may, however, develop into an acute nephritis, and in some cases may, especially after surgical

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operations, particularly those of the genito-urinary tract, prove rapidly fatal, death occurring in one or two days. It may, on the other hand, pass into a typhoid condition, and after giving marked indications of uræmic poisoning, terminate in recovery.

When the cause has been the administration of Cantharides, Turpentine, etc., the general symptoms will vary with the quantity of the drug introduced into the system. There will be some rise in temperature, nausea, vomiting and diarrhœa, pain in the loins, frequently extending across the abdomen, with moderate stupor and delirium. When from overexercise the general symptoms, except the change in the urine, frequently pass unnoticed. This fact is well demonstrated by cases reported by Dr. Andrew Macfarland in the Medical Record of Dec. 22, 1894. He carefully examined the urine of the members of a football team before and after the game, and though in each case there was no clinical evidence of disease, he found albumen, casts and epithelia in the urine, which entirely disappeared, and the urine, in from a few hours to a few days, returned to a normal state.

The clinical history therefore may be said to vary greatly.

The urine is albuminous and smoky; it may contain red blood corpuscles and tube-casts of various kinds, especially hyalin. The urine of the football players referred to above contained large and small granular blood and epithelial casts.

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PROGNOSIS depends upon the cause. If from excessive bodily exercise, recovery almost always occurs, unless the cause is too often repeated, when it may be the beginning of a serious kidney lesion. If from poison, it will depend upon the quantity taken in the system. If from surgical operation, the result will depend upon the severity of the original cause, though some surgical cases die from congestion of the kidneys, even when the operation has been comparatively trivial.

TREATMENT.—If the congestion is from over-exertion, Arnica, Sandalwood or Aconite; from exposure, Aconite, Dulcamara, Belladonna or Rhus tox; from surgical operations, shock or mechanical injuries, Veratrum viride, Aconite, Arnica, or Belladonna; when associated with gastric or hepatic disturbances, pain in the back, etc., Mercurius corrosivus, Cantharides, or Terebinth. For general symptomology see Chapter XL.

Rest in bed is of great importance. Baths at a temperature of 100° F. Hot packs over the loins and hot foot baths, with an absolute milk or fluid diet and an abundance of pure (not hard) water, preferably Poland or Hygeia, are always indicated.

Acute congestion of the kidney, resulting from surgical operations, are very liable to prove rapidly fatal and the best directed treatment will often fail. If the lesion has been caused by poison, administer an antidote and eliminate the poison as soon as possible from the stomach and system. When from Cantharides, give two to four grains of Camphor every two to four hours, as an antidote, whether the drug has been introduced by the mouth or in the form of a blister.

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CHAPTER V.

Chronic Congestion of the Kidneys.

Etiology.— This condition is caused by venous stasis in the renal circulation due to weakness in the heart-power, from chronic endocarditis, myocarditis or dilatation, aneurism of the arch of the aorta, pulmonary emphysema or carnification; also by the long continued presence of pathological fluids in the pleural sac. It is a frequent concomitant of chronic cardiac lesions, but it appears only when there has been sufficient loss of the heart tone or power to allow the venous blood to accumulate abnormally in the veins of the kidneys.

Pathological Anatomy.— The kidneys may be large or normal in size. They are proportionately heavier and firm in consistency. The surfaces are smooth and capsules non-adherent. They are dark in color, but there is a marked contrast between the pyramids and cortex, the latter being somewhat paler and of a bluish-gray tint.

The cells covering the capillary tufts are swollen, some of the cells lining the glomeruli are swollen and opaque, others are normal.

In the tubes of the cortex the epithelium may be swollen or flattened. The swollen cells are granular. The lumen of the tubes may contain fibrin, leucocytes and red blood cells. The stroma is unaltered.

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CLINICAL HISTORY.—This disease may be suspected when there is a history of marked pulmonary emphysema, or carnification caused by chronic pleuritic adhesions, or from any weakness of the heart power. The clinical manifestations of patients suffering from chronic congestion of the kidneys will vary greatly with the concomitant pathological conditions which are associated with it, both from the original cause and other renal lesions, *i. e.*, chronic degeneration, interstitial or parenchymatous nephritis.

The urine is scanty, dark in color, of high specific gravity, and, on standing, deposits large quantities of urates and uric acid. Albumen is sometimes present in small quantities, together with a few hyalin casts and red blood corpuscles. Dropsical conditions are frequently present, the œdema being confined to the lower extremities, while the upper extremities and face escape, thus assuming the character of a cardiac dropsy. There is a diminished secretion of urine, accompanied by gradual loss of strength and flesh, nausea, vomiting, headache, delirium, coma, and possibly convulsions. In other cases, a typhoid state may develop.

The remedies will be those which best correspond to the general condition of the patient.

TREATMENT.—Arnica has been given with satisfactory results when there was general dropsy with a bruised feeling of the body. Convallaria when from cardiac dilatation and hypertrophy; heart's action rapid and irregular, with general anasarca and lame feel-

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ing in the back, aggravated by lying down. Digitalis when there are suffocating spells, sinking, faint feeling at the pit of the stomach, feels as if about to faint, pulse feeble and low: renal congestion, due to enfeebled muscular power of left ventricle. Phosphorus in renal congestion, due to loss of muscular power of right ventricle; weak, empty feeling in whole abdomen. If the cause can be removed or ameliorated, much comfort and relief can be given the patient. When caused by cardiac disease, physiological treatment may be indicated. An over-acting heart, or excessive action, due to contraction of the arterioles will require Nitro-glycerine. If there is simple over-action Aconite, Belladonna or Veratrum-viride may act satisfactorily. If there is want of tone or weakness, Digitalis, Strychnine, Caffein, or Strophanthus. Delafield advises small doses of Codeia or Morphia in the later stages of chronic congestion of the kidneys from aortic and mitral stenosis or myocarditis, with disease of the coronary arteries.

Hot air baths may be required, and sometimes prove very beneficial.

Rest in bed is frequently very important, and good nourishing food, especially animal diet, should be advised.

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CHAPTER VI.

Acute Nephritis.

ETIOLOGY.—Its most frequent causes are exposure to cold and damp, mechanical injuries or irritation from calculi. It is most frequent in the aged, and is a disease mostly prevalent in damp climates.

CLINICAL HISTORY.—One kidney alone is involved. The disease begins with a chill, and is followed by high fever, with dull pains over the affected kidney, aggravated by motion and pressure. The pain may radiate to the umbilicus, down the thigh, and along the course of the anterior crural nerve; the testicle on the side involved is usually retracted. Nausea and vomiting accompany the early symptoms, diarrhœa and tenesmus are not infrequent. The urine is scanty, high colored, with increased specific gravity, and may contain blood and some albumen; micturition is frequent.

PROGNOSIS is favorable; recovery usually occurs in from one to three weeks, although it may result in suppuration.

TREATMENT.—That directed for acute parenchymatous nephritis.

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CHAPTER VII.

Acute Degeneration of the Kidney.

Etiology.—Conditions of the blood dependent upon acute and infectious diseases often cause renal degeneration. It is also caused by the presence in the system of certain mineral poisons, as Arsenic or Phosphorus. The Bi-chloride of Mercury has frequently caused it when used as an antiseptic dressing or douche, and Weilander, in Univ. Med. Journal, Aug., 1894, from Hygiea, 1894, reports that this condition was noticed in ninety-seven cases of syphilis while under mercurial treatment, which disappeared when the drug was eliminated from the system. The degree of degeneration, or death of the epithelium, and the quantity of exudate from the blood vessels will vary with the amount of the poison introduced into the system. As a concomitant of infectious diseases, the degree of acute degeneration varies with different epidemics; why, we do not at present know, but the pathological changes, whether caused by an acute infectious disease or a mineral poison, are identical.

Pathological Anatomy. — The kidneys are increased in size. The surfaces are smooth and the capsules non-adherent. The cortical portion is thickened and pale.

The changes which take place are in the pa-

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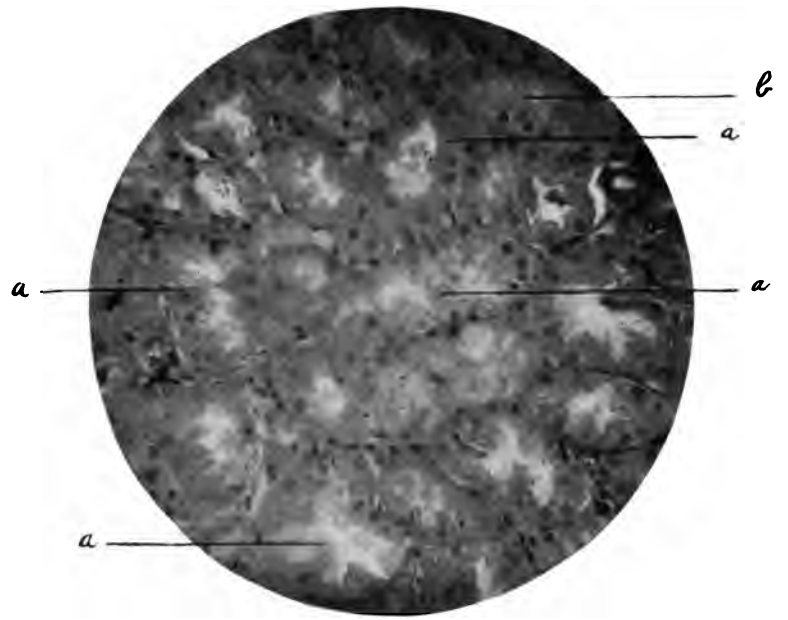
PLATE I.



(MAGNIFIED 450 DIAMETERS.)

FIG. 1.

ACUTE DEGENERATION OF THE KIDNEY.

a. Degenerated epithelium. *b*. Lumen of tubule obliterated by swollen and necrotic epithelium.

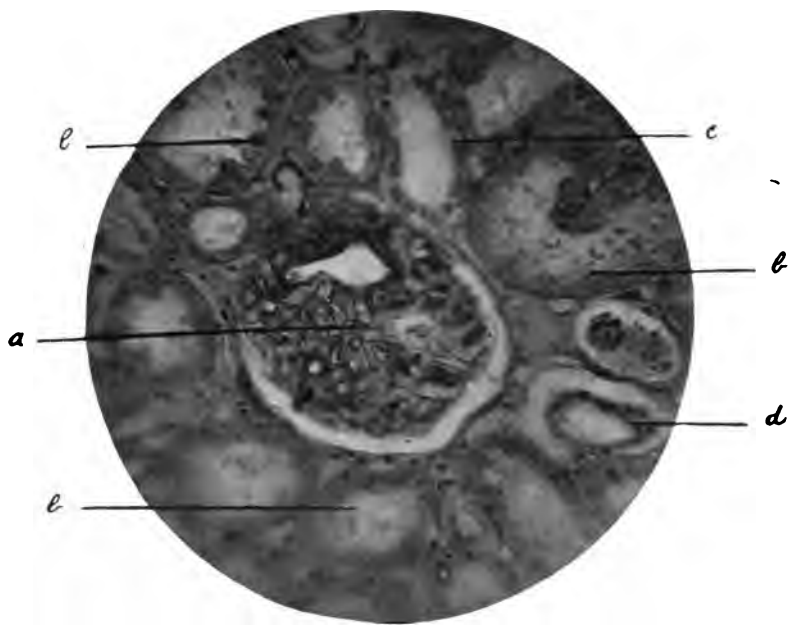


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FIG. 2.

CHRONIC CONGESTION OF THE KIDNEY.

a. Capillary tuft, showing a swelling of the epithelium and dilated capillaries. *b*. Swollen epithelium of tubules. *c*. Flattened epithelium. *d*. Flattened epithelium, detached from wall of tubule.

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renchyma of the organ, and more markedly in the convoluted tubules.

The epithelium lining the tubules and glomeruli, and that covering the capillary tufts of the glomeruli, is swollen and opaque; sometimes the swelling is so great as to completely fill up the lumen of a tubule. The swollen cells may be infiltrated with granular fatty substance: some of the cells become detached from the wall of the tubule, or a part of the cell may tear off and drift away as granular debris.

In the lumen of the convoluted tubules may be seen hyaline material, and in the straight tubules detached epithelium and hyalin casts.

Clinical History.—Is important only as an accompaniment of acute infectious diseases—measles, scarlet fever, typhoid or yellow fever and pneumonia, or in cases of poisoning by Mercury, Arsenic, Phosphorus, etc. It is not accompanied by dropsy or arterial tension. It is usually transitory in nature, and as the condition causing it is removed or disappears, the parts return to their normal condition. When following a severe case of mineral poisoning, or accompanying acute infectious diseases, as yellow fever, etc., delirium, convulsions, coma, and death sometimes occur, though it is often difficult to say whether death is due to the kidney lesion or to the action of the original cause in other organs of the body. Micturition is increased in frequency, and the urine is usually diminished in quantity or suppressed. It has a smoky

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appearance, contains albumen, blood and casts; the specific gravity is normal, or slightly increased. It should be always remembered that in the acute infectious diseases, acute degeneration of the kidney appears especially in the early stages, while acute parenchymatous nephritis occurs late in the history of the case, and its prognosis is far more grave.

TREATMENT.—The remedies most frequently required are Belladonna, Cicuta vir., Arsenicum, Apis mel., Terebinth and Rhus tox. For special indications see Chapter XL.

If caused by a mineral poison, remove it at once and administer an antidote. If from an infectious disease, its treatment will generally suffice.

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CHAPTER VIII.

Chronic Degeneration of the Kidney.

Etiology.—The principal cause is obstruction to the circulation from cardiac or pulmonary disease. It occurs sometimes without apparent reason. It may be due to the cachexia which accompanies catarrhal phthisis, pulmonary tuberculosis, cancer, etc. It seems to be a grade beyond a chronic congestion of the kidney, and is characterized by degeneration ot the epithelia lining the urinary tubules.

Pathological Anatomy.—The kidneys are enlarged and two or three times heavier than normal. Their surfaces are smooth. The markings are very distinct. There is a decided contrast between the cortical and pyramidal portions—the former being pale and thickened, the latter hyperæmic and dark.

The epithelium lining the convoluted tubes is swollen and granular, the cells covering the capillary tufts of the glomeruli are swollen and the capillaries themselves are dilated. The veins of the pyramids are engorged.

Sometimes the kidneys are not enlarged and show no change in the gross appearance other than congestion of the pyramids.

Clinical History.—The condition is very often overlooked. The urine may appear normal, or from time to time contain a small quantity of albumen and

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a few casts; this is especially true in cases caused by grave chronic constitutional disease, or unknown causes. When the condition accompanies chronic heart lesions, the urine may vary in quantity, and often becomes scanty or suppressed. The specific gravity is about normal, and the percentage of urea is scarcely affected. Chronic degeneration of the kidneys does not of itself cause dropsical symptoms, interfere with the heart's action, or produce uræmia. There is an interference with the power of assimilation and, consequently, progressive weakness and emaciation, which may finally become so marked as to cause death from asthenia.

TREATMENT.—The remedies most indicated are Phosphorus, Arsenicum, Rhus tox, etc. For symptomatology see Chapter XL. The diet should be liberal, easy of digestion and assimilation. The general hygiene and regulation of the habits of the patient must receive proper attention, and the original cause removed or ameliorated.

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CHAPTER IX.

Acute Parenchymatous Nephritis.

Acute Bright's, Acute Croupous Nephritis, Post Scarlatinal Nephritis, Tubal Nephritis, etc.

Millard describes this condition as a nephritis characterized by exudation into and infiltration of the connective tissue with secondary changes in the epithelium, the whole leading to the formation of casts and being invariably accompanied by albuminous urine. Delafield divides this condition into the Acute Exudative and Acute Productive Nephritis. Acute exudative nephritis he describes as an inflammation of the kidneys characterized by congestion, exudation of the blood plasma, emigration of the white blood-cells, diapedesis of the red blood-cells, to which may be added changes in the renal epithelium and in the glomeruli: and acute productive nephritis as an acute inflammation of the kidneys, characterized by exudation from the blood-vessels, a growth of new connective tissue in the stroma and changes in the epithelium and glomeruli. The pathological changes of these two forms are easily recognized in their morbid anatomy, and usually can be differentiated diagnostically. As their clinical histories are similar, they will be classed under the general head of acute parenchymatous nephritis, and their differential diagnosis, pathological

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anatomy, history, prognosis and treatment will all receive proper attention.

ETIOLOGY.—This disease is most frequently met with in childhood, and is rare in those past forty years of age. When it occurs before the twelfth year, it is usually of the exudative variety; after that period the majority of the cases are sub-acute in character and of the productive form.

This is readily explained when considering the exciting cause of these kidney changes. Among the most frequent causes leading up to the development of acute parenchymatous nephritis are exposure to draughts, especially after bathing or over-heating of the body, colds from getting wet, improper or unseasonable clothing, etc. In childhood the most frequent cause is the presence in the blood of bacteria of infectious diseases or their ptomaines, which, passing through the kidneys in the process of excretion, produce at first irritation of the parenchyma of that organ and ultimately inflammation, which, if it is of the exudative variety, will be transient in nature, but if of the productive form will frequently result in chronic lesions of the kidney. The disease is therefore frequently found as a complication or sequela of measles, scarlet fever, small-pox, typhus, typhoid, cerebro-spinal meningitis, influenza, parotitis, catarrhal tonsilitis, diphtheria, pneumonia, chicken-pox, erysipelas, etc. The experiments of Vissman (Med. Record, Sept. 14, 1895) demonstrates that antitoxin is a common cause of acute parenchymatous nephritis.

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The occurrence of this disease in the diseases mentioned varies greatly with the different epidemics. It has been noticed that it bears no special relation to the severity of the original infectious disease. It is not infrequently a concomitant of acute articular rheumatism. Extensive burns of the body have been known to cause it, and it so often follows constitutional cutaneous lesions that they also may be considered as exciting causes. The disease also appears as a sequela of septic inflammation, surgical and puerperal fevers, anthrax, etc.

Malarial conditions in many cases are undoubtedly the cause of this disease. During an attack of intermittent and of bilious remittent fever albumen and renal epithelia can almost always be found in the urine. It is generally believed that the presence of the bile acids in the blood, which, when excreted by the kidneys, irritate and lead to inflammation of the kidneys, explains this cause on the same principle as the well-known effect of Turpentine, Copaiba, Cubebs, Ginger, Arsenic, Corrosive sublimate, Potassium chlorate, Carbolic acid, Pyrogallic acid or Squills on that organ.

The nephritis from the last named irritants is usually of the exudative variety, is transitory, and subsides on the removal of the cause. The same would be true of the nephritis developed in the malarial diseases, were it not for the fact that the attacks are usually frequently repeated, and these repeated attacks may develop a productive nephritis and ultimately a chronic nephritis. Sometimes an acute parenchyma-

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tous nephritis will engraft itself without any discoverable cause on any one of the more chronic forms of Bright's disease, although these apparently new invasions in chronic nephritis must be considered only as exacerbations.

Bacteria in the blood, independent of any of the known bacterial diseases, have been known to cause acute parenchymatous nephritis, by their presence in the kidneys during the process of elimination, the lesion developing rapidly and terminating in uræmia and death. These bacteria are rod-shaped and resemble the micro-organisms found in the blood of those suffering from typhus. In the bacterial form of acute parenchymatous nephritis the bacteria after death are found not only in the kidneys, but also in the blood and urine. When these bacteria are cultivated even to the fourth generation, and rabbits are inoculated with the culture, the same lesion of the kidney is produced. This bacterial form of acute nephritis accounts for many cases which would otherwise be mysterious in origin, though we should remember that the presence of bacteria in the urine does not necessarily mean pathological changes in the tissues, for bacteria do appear in the urine when all the organs are in a healthy state, as after drinking impure water or eating old cheese. There is also a certain inherent condition of the blood, without bacteriological contamination, which will, in itself, act as an irritant and induce nephritic inflammation.

Pathological Anatomy.—The acute exudative type

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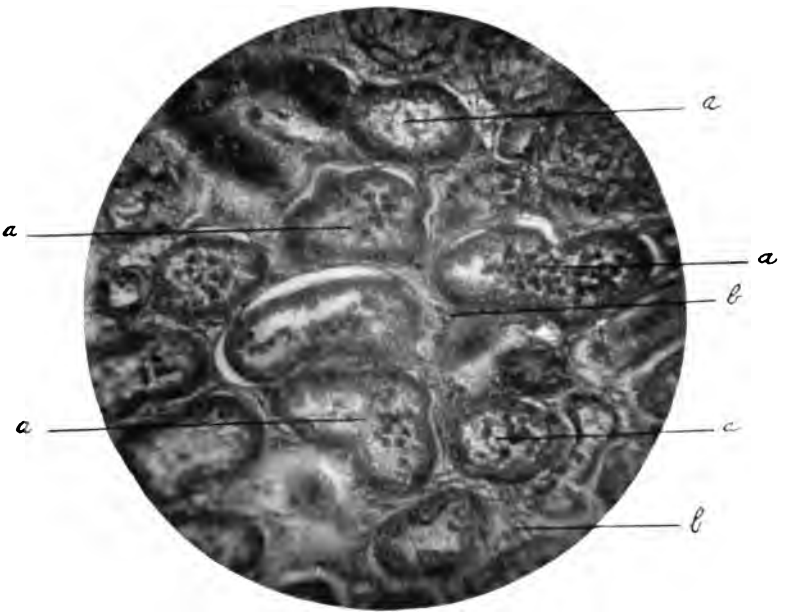
PLATE II.



(MAGNIFIED 450 DIAMETERS.)

FIG. 1.

ACUTE EXUDATIVE NEPHRITIS.

a. Convoluted tubules, filled with the exudate of fibrin, red blood cells and leucocytes.
b. Exudate in stroma.

(MAGNIFIED 450 DIAMETERS.)

FIG. 2.

ACUTE EXUDATIVE NEPHRITIS.

a. Glomerulus. The epithelium covering the capillary tuft is swollen and opaque.
b. Convoluted tubules, filled with exudate. *c*. Tubule, with flattened epithelium.

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of acute parenchymatous nephritis is described by Delafield as acute exudative nephritis. There is no connective tissue change in the stroma. The kidney is increased in size. The cortex is thickened and pale. If there has been a considerable exudation of pus cells, this may be evident by whitish foci of the exudate in the cortex. The surfaces are smooth, and the capsules non-adherent.

The epithelium of the convoluted tubules may be flattened, and the tubules dilated, or the epithelium may be swollen and necrotic, and in some places detached from the walls.

The tubules may be empty, or they may contain the detached epithelium, hyaline material, and masses of debris; probably portions of the necrotic cells. If the exudation has been severe, they contain fibrin, pus, and in some cases red blood-cells. The straight tubes, in addition to the exudate, may contain hyalin, granular and epithelial casts.

In the glomeruli the epithelium is swollen, sometimes so much so that the cells resemble those lining the tubes, and contain the same exudate. The cells of the capillary tufts are swollen and the normal aspect, which shows the convolutions of the capillaries, is changed to a more or less inordinate mass of swollen epithelium.

Although there is no connective tissue change in this form of nephritis, there may be an exudation of serum, leucocytes, and red blood-cells into the stroma.

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The inflammatory process, as a rule, is not diffused throughout the whole organ, but appears in foci of varying size, some portions of the kidney remaining apparently normal.

If the patient recovers, the inflammatory product is absorbed and the kidney returns to its normal condition.

Acute productive nephritis. In this form of nephritis there is, in addition to the exudative form, a new growth of connective tissue and permanent changes in the glomeruli.

In the more recent cases, the surfaces are smooth, but in those where the inflammatory process is more advanced the surfaces may be roughened and the capsules adherent.

The cortex may be pale and thickened, or it may be mottled red and yellow. The color may, however, be unchanged. The cortex is hyperæmic and dark, and the pelvis is, as a rule, deeply congested.

The growth of new connective tissue takes place in wedge-shaped portions of the kidney; corresponding to the territory supplied by an artery. These affected areas may be concrete and discernible, or two or more may merge together and render the changed portion more or less diffuse.

The epithelium of the convoluted tubules may be flattened, or the cells may be swollen, necrotic and detached. The tubes themselves contain fibrin, pus, and some of the necrosed cells. As a rule, the tubules, where the cells are flattened, do not contain

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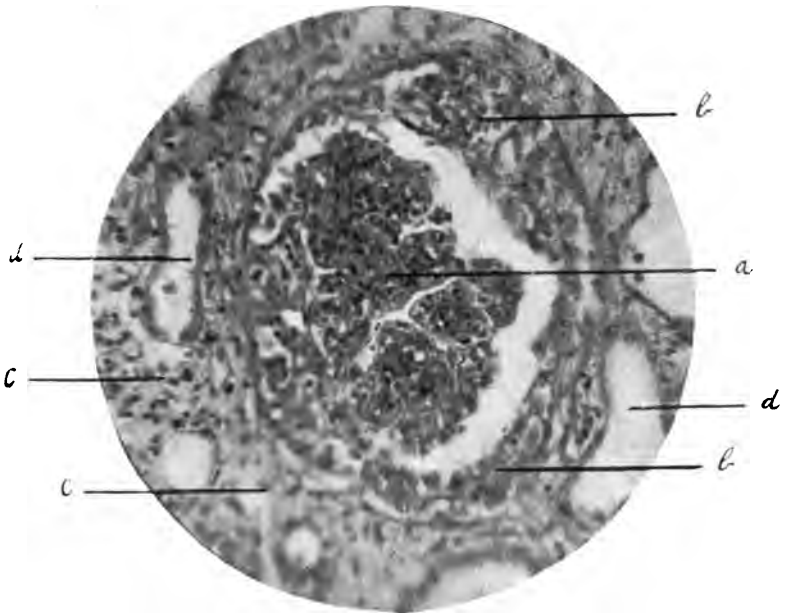
PLATE III.



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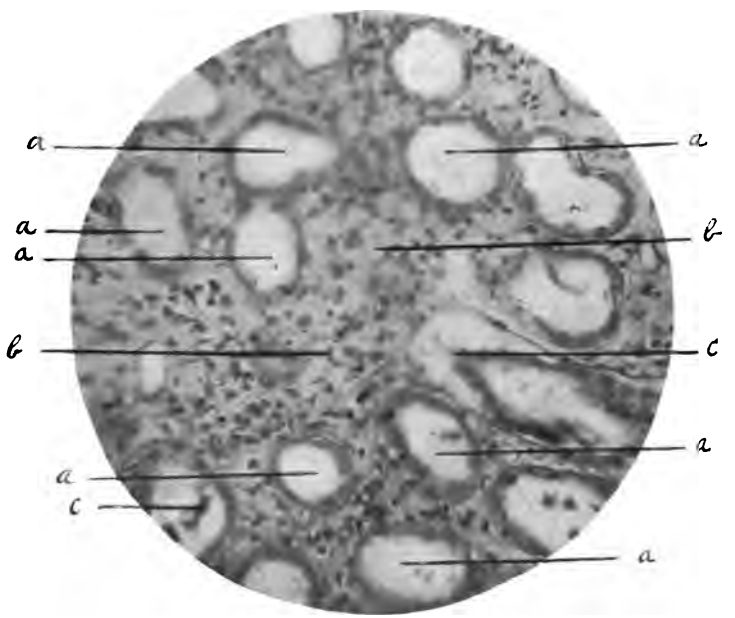
ACUTE PRODUCTIVE NEPHRITIS.

a. Capillary tuft. *b*. Hyperplasia of cells lining glomerulus. *c*. Connective tissue growth in the stroma. *d*. Tubules, with necrotic epithelium.



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ACUTE PRODUCTIVE NEPHRITIS.

a. Convoluted tubules, with necrosis of epithelium. *b*. New connective tissue growth. *c*. Detached epithelium.

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as much exudate as those where the lining cells are swollen and necrotic.

In the portion of the kidney where there is connective tissue growth, some of the tubules may be atrophied.

The straight tubes may contain hyalin, granular and epithelial casts.

In some of the glomeruli there is only a swelling and breaking down of the lining epithelium. In others there is a marked hyperplasia of the capsule cells, sometimes to such an extent as to severely encroach upon the capillary tuft. These proliferated cells undergo fibrous degeneration.

The cells of the capillary tufts are swollen and opaque.

Clinical History.—The severity of the attack varies from one so slight that it often passes unnoticed, or is only accidentally discovered by urinary analysis, to one where the inflammation is so intense as to quickly overpower the system and cause death in a short time.

The exudative variety is usually more intense and acute in form, although in some cases the productive variety is equally acute and cannot by the symptoms be differentiated from the exudative. Productive parenchymatous nephritis is usually sub-acute in character. The acute parenchymatous nephritis accompanying scarlet fever, that which develops during an attack of diphtheria and in pregnancy are usually of the productive variety, and the prognosis is conse-

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quently more grave, death frequently resulting. Some recover, as is the rule with exudative variety, but more often complete recovery does not take place, although at the time the patient may seem to be restored to health. At greater or less intervals repeated attacks occur until finally the condition passes into the chronic form.

The exudative variety of acute parenchymatous nephritis is the form which usually develops during the attacks of the other infectious diseases, etc., and in many of those occuring in scarlet fever, diphtheria and pregnancy. They are sometimes fatal, but the majority run a rapid course of one or two months and entirely recover.

In most cases of acute parenchymatous nephritis the cardinal diagnostic points are well marked—*i. e.*, scanty high-colored urine, with increased specific gravity, containing an abundance of albumen, blood, epithelial casts, epithelia and blood corpuscles, rapidly developing dropsy, both general and local, nausea, vomiting, headache, muscular twitching, convulsions, pain in the back, possibly epistaxis, heart impulse increased or diminished, high arterial tension, etc., give a picture so clear that it cannot be easily misunderstood. The disease may commence with a distinct chill, followed by fever, the temperature rarely rising above 101° F. This is the rule when the nephritis is the result of exposure to cold or dampness. When, however, it occurs in the course of, or follows some other morbid condition, the fever may be due largely

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to the original cause. Fever may sometimes be absent. Pain of a dull, aching character, referred to the small of the back and extending down the course of the ureters, is a frequent symptom. When the disease has been caused by exposure, the pain is not so marked as in the other varieties, and is often absent. Nausea, vomiting and headache frequently announce the commencement of an acute nephritis, especially when the disease occurs as the consequence of scarlet fever and other infectious diseases. The vomiting is sometimes persistent and troublesome, but fortunately quickly disappears. Anæmia appears early, producing the characteristic waxy appearance. Dropsy and scanty urine are usually the earliest symptoms noticed. The dropsical condition first appears under the eyelids, and rapidly extends all over the body, involving not only the lower extremities and scrotum, but also the serous cavities. It may also lead to the more serious œdema of the lungs. These dropsical accumulations follow no special course of development, and, therefore, vary greatly in different cases; in some cases the anasarca is so slight as to be scarcely noticeable. The amount of dropsical effusion often bears no relation to the intensity of the renal involvement. As convalescence is established, the dropsical effusion slowly disappears, though sometimes it does so rapidly, accompanied by watery stools and polyuria. The urine usually bears a special relation to the dropsical condition, and the degree of nephritic inflammation. Micturition is increased in

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frequency, though there may be complete anuria. Many cases are recorded where suppression of the urine persisted for days and was followed by recovery. Opinion varies as to the cause of anuria. The urine, however, is usually scanty, smoky, reddish or pink from the admixture of blood and contains an abundance of albumen. In some cases it may be a few days before its presence can be clearly demonstrated; it is always present at some time or other in the exudative variety, and when it once appears, it persists until the case is cured or death takes place. It may disappear in the productive form of the disease, or become quiescent, to reappear when the exacerbation shows itself apparently as a new invasion. The chlorides are absent, the phosphates diminished and uric acid and the pigments are increased. The quantity of urea is diminished, the specific gravity is high, and varies from 1025 to 1030. The reaction is always acid. The sediment is usually abundant and contains blood, hyalin, and granular casts, red and white blood corpuscles, epithelia both from the convoluted and straight tubules and pelvis of the kidney, with crystals of uric acid, urates, oxalates, etc. As recovery takes place the specific gravity is usually lowered, and may fall as low as 1010 with polyuria, which, however, soon disappears and is followed by the establishment of the normal urinary secretion.

The pulse is hard, tense, and increased in frequency. The tension of the arterial system is always marked, and, as a consequence, dilatation of the heart some-

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times rapidly occurs (in from 2 to 4 days); compensatory hypertrophy is frequent. These may be distinguished by their physical signs during life. When compensatory hypertrophy does not occur the dilatation often gives rise to dyspnœa, even when pulmonary œdema is absent. They sometimes cause sudden death.

Uræmic symptoms and complications are announced by the headache, stupor, jactitations, convulsions, etc., which may come on insidiously. This is especially true in uræmic dyspnœa, a condition from which the patient rarely recovers. The uræmic symptoms may appear when the urine is copious and free from blood and casts and with only a small amount of albumen, as well as when the urine is scanty in amount and contains an abundance of albumen. Amaurosis is frequently present. Derangements of the alimentary tract are often noticed. The duration of the disease varies from two to several weeks, and in some cases it is months before recovery is complete and albumen and casts have ceased to appear in the urine. As resolution occurs the skin which was dry and hot becomes moist, the urine is paler and more copious, the dropsy disappears slowly—though it may do so rapidly by critical discharges from the bowels and kidneys—and the constituents of the urine soon become normal.

In acute parenchymatous nephritis from non-infectious bacteria there is moderate fever, and the urine contains a small quantity of albumen, a few leucocytes, and red blood corpuscles with a large number of bacteria.

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These cases are usually mild in character and last from one to six weeks.

The malarial form may be of the exudative or productive variety, and is characterized by the large quantity of blood in the urine. Recurrent attacks are apt to be frequent unless the patient is at once removed from the malarial region.

In diphtheritic nephritis the dropsy is never marked, cardiac hypertrophy does not develop, the disease usually running a rapid course terminating in recovery. If it is of the exudative variety the urine rarely contains blood casts or corpuscles and the specific gravity is never high.

As a complication or sequela of typhoid fever it is usually accompanied by catarrh of the urinary tract, which makes its appearance during the second week of the disease. Bodin, in N. Y. Medical Journal, August 11th, 1894, describes three varieties. 1st, one in which albumen appears more or less abundantly in the urine, with suppression of urine, œdema and symptoms of acute uræmia, terminating fatally with coma or convulsions. 2nd, a variety less violent, but always grave; urine diminished in quantity, albuminous, and containing blood. 3rd, the most frequent; characterized by aggravation of the general condition, dryness of the tongue, pain in the loins, headache, and the appearance of a small quantity of albumen in the urine. The urine in this variety of acute parenchymatous nephritis frequently contains micrococci, with or without the bacillus of Eberth, streptococci and staphylococci. It

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is believed that these bacteria enter into the blood from the intestines through intestinal ulceration.

In relapsing fever there is an abundance of desquamated renal epithelia in the urine. When the disease occurs as the result of exposure to cold and dampness, it is usually ushered in by a chill, followed by high fever, pain in the back and rapidly developing dropsy. When from scarlet fever it usually makes its appearance between the second and sixth week of the disease, and is announced by nausea, vomiting, diminished secretion of urine, and headache. When of toxic origin, it is usually accompanied by frequent micturition, bloody urine, and the general symptoms of an acute cystitis.

There is a form of acute exudative nephritis which deserves special notice, and which is characterized by the presence in the urine, in addition to the usual elements found in nephritis, of a large quantity of pus cells, which do not occur as the result of an associated cystitis but are due to the excessive violence of the nephritic inflammation. It occurs in some of the infectious diseases both in childhood and adult life. The symptoms appear suddenly and with great intensity. Restlessness, delirium, coma and convulsions are marked, dropsy is absent or slight, prostration appears early and progresses rapidly, followed by a typhoid state and death. There are but few recoveries. This form is believed to be due to some unknown micro-organism.

Prognosis.— The prognosis in acute exudative ne-

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phritis is far better than in acute productive nephritis In the acute exudative variety, when the cerebral symptoms are not prominent and the disease pursues the ordinary course, a favorable termination may be looked for. When grave cerebral manifestations are present (headache, restlessness, delirium, coma, and convulsions), the prognosis must be guarded, though it is sometimes favorable even in the most alarming cases; much, however, depends upon the exciting cause: when, on account of the severity of the inflammation, pus cells appear in the urine in large numbers, the prognosis is very unfavorable. When from intermittent fever, exposure to cold or from diphtheria, the prognosis is favorable. When of the acute productive variety, the prognosis is very unfavorable, even when the patient does not present serious symptoms. Either death will occur in a few days, weeks or months, or after numerous exacerbations and apparent recoveries, the patient finally passes into a chronic and incurable state. In the post-scarlatinal form, the majority of deaths occur either from uræmic complications or from heart failure due to acute cardiac dilatation. Sometimes, in cases where there are no specially severe symptoms, sudden death occurs from this cause. Uræmia is not necessarily fatal. Pulmonary œdema, œdema glottidis, hydro-thorax, hydro-pericardium, ascites, and the occurrence of local inflammations in the pleura, lungs, or peritoneum are serious complications and liable to cause death.

Anuria, when persistent, generally indicates a fatal

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termination, though it sometimes continues for days without causing unfavorable symptoms. The danger in acute nephritis depends upon the impairment of the excretory power of the kidneys and the consequent retention of water and nitrogenous substances in the system which should have been eliminated.

TREATMENT. — In the early stage of acute exudative nephritis, Aconite, Belladonna, or Veratrum viride will be the drugs most frequently indicated, to be followed by Cantharides, Rhus tox, Apis, Helleborus niger, or Apocynum cannabium. If of the productive variety, Mercurius corrosivus, Arsenicum or Plumbum carbonicum. Uræmic symptoms and convulsions will call for Cuprum arsenite, Cicuta virosa, Stramonium, Cannabis Indicus, Carbolic acid, Ammonium carbonicum, Hyoscyamus, etc.

Aconitum napellus. Acute nephritis from cold or secondary to scarlet fever, with rapid development of anasarca, high fever, restlessness, with soreness in the lumbar region. The pulse may be small and tense, with general feeling of anxiety, irritable stomach, surface of the body cool; the patient starts from sleep in agony with cold sweat on forehead and limbs.

Apis mellifica. Acute nephritis complicating scarlet fever or pregnancy. The dropsical conditions develop rapidly; the œdematous parts have a waxy hue. There is no thirst, limbs and back ache. Mental condition dull; tonic and clonic spasms. All symptoms are worse the latter part of the night, and are relieved when sitting erect.

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Apocynum cannabinum. Causes increased blood pressure and congestion of the kidneys. It has been called the vegetable trocar—from the rapidity with which general dropsies disappear when it is administered in appreciable doses—*i. e.*, two drop doses of the tincture in a dram of water every hour, or better yet, one half dram doses of a fresh infusion. This remedy is indicated in acute nephritis with scanty, dark colored urine. There is great thirst, but water nauseates; oppression in the epigastrium and chest; pulse irregular, intermittent and feeble; stupor, with constant automatic movements of one arm or leg.

Arsenicum album. Is rarely indicated in the exudative variety, but is invaluable in the productive form of acute nephritis. When dropsical conditions are present, all symptoms are sub-acute, with progressive weakness, anxiety, restlessness, uræmia, and thirst for small quantities of fluid. Dyspnœa, either from cardiac weakness or œdema of the lungs, worse on lying down, especially recurring at or after midnight, and relieved by expectoration. Goodno says he obtains the best results from this remedy when he administers it in the form of Fowler's solution, drop doses every four to eight hours.

Belladonna. Acute parenchymatous nephritis with flushed face, fever, and possibly delirium, characterized by tendency to strike and bite. This remedy relieves the congestion of the Malpighian capillaries but does not affect the secreting epithelium of the convoluted tubes. Large doses aggravate; the medium potencies give rapid relief.

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Cantharides. Following the antiphlogistics Aconite, Belladonna, Veratrum viride, etc., this becomes one of the most potent remedies, especially in the nephritis of scarlet fever and diphtheria. Dr. Dessau, Med. Times, 1895, quotes Prof. Cornil, London Practitioner, Vol. 27, P. 110, who says: "When the kidney of "dogs and rabbits, poisoned with Cantharides, pro- "duced a nephritis it was impossible to distinguish it "from a condition of the kidney found in children "dying from the nephritis of scarlet fever or "diphtheria. These observations will be quoted in "full, as they give perfect indications for the remedy "in acute parenchymatous nephritis. He observed "intense congestion affecting the glomeruli, increased "tension of the blood in the vessels, the passage "through their walls of its liquid constituents, of "serum carrying granules along with it, and some red "and white blood corpuscles which accumulated in "large numbers in the glomerulus. At a later stage "the inflammation shows itself in the straight and "convoluted tubes by multiplication of the cells and "modification of their form and migration of leu- "cocytes." Pain in the region of the kidneys, loins and abdomen, with constant desire to urinate. Burning, stinging and tearing pains in the region of the kidneys, uræmia, delirium and coma, with high fever, and hard, frequent pulse.

Cicuta virosa. Is beneficial in uræmic conditions, characterized by the twitching of individual muscles.

Cuprum arsenite. Goodno says: "For uræmic symp-

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toms in acute nephritis, unless contra-indicated, I now administer this drug in the second or third decimal trituration, in three-grain doses, repeated every half hour to two hours until the symptoms subside. The remedy possesses a most remarkable influence over uræmic convulsions. In quite a number of typical cases seen by him and others, its use has been followed, even in desperate cases, by the disappearance of the convulsions, improvement being usually apparent in from two to four hours." The experiments of the Central Homœopathic Society of Germany show conclusively that this remedy causes renal inflammation and degeneration of the epithelium of the tubules of the kidney, with scanty and albuminous urine.

Helleborus niger is especially useful in post-scarlatinal nephritis with dropsy, scanty high-colored urine, with or without mental stupor from uræmic conditions. Five-drop doses of the tincture in water every two to four hours will act rapidly in the sudden dropsies of acute nephritis.

Mental torpor predominates, pupils dilated, the eyes do not react to light, and while the patient sees imperfectly, he does not comprehend what he sees. Violent pains in the head—so severe as to cause constant change of position—dull pain in occipital region, worse on stooping; nausea, vomiting, absence of thirst; convulsions, with cold extremities; dropsical conditions, with frequent desire to urinate.

Mercurius corrosivus is indicated in the productive form of nephritis. It causes inflammation of the kidneys,

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acute congestion, or inflammation of the secreting portion. The urine is blackish, scanty, or completely suppressed, and contains albumen, blood corpuscles, and granular and fatty casts. The epithelial cells from the uriniferous tubules, are found to be in a state of fatty or granular degeneration. Goodno says the patient looks wretched, is anæmic, short of breath, the urine is highly albuminous, and micturition is frequent. It acts best after the dropsy has subsided somewhat, or is not a prominent feature. The third trituration has been found the most efficacious.

Rhus toxicodendron. Goodno says: "After subsidence "of the initial hyperæmia, I have found this medicine "useful in cases not marked by dropsy. In idiopathic "nephritis; in nephritis clearly attributable to exposure "to cold and damp, especially when brought on by "getting wet during a cold rain; in nephritis ushered "in by much pain in the back and general soreness "or aching, also in some cases following scarlatina "without these conditions." He advises the tincture in ¼ drop doses hourly.

Terebinth will be found especially useful in acute croupous nephritis from colds and malarial conditions. From its pathogenesis it is only indicated when blood is found in the urine. Its main influence is expended upon the Malpighian bodies. The urine is scanty, smoky, bloody or almost suppressed; dropsy may be absent. It is rarely indicated in cases where uræmic symptoms are present.

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Veratrum viride is required for the congestion of the cerebral vessels, for the convulsions in the early stage and during the course of acute parenchymatous nephritis. When indicated by the increased arterial tension, high temperature, and thin, small pulse with troublesome vomiting, it quickly relieves the symptoms.

In addition to the above, Cannabis Indicus, Plumbum carbonicum, Chelidonium, Colchicum, Sabina, Scilla, Veratrum album, Antimonium tartaricum, Bryonia alba, Nitric acid, Glonoin, etc., may be required. For special and more complete indications see Chapter XL.

While many cases could be prevented by the observance of proper hygiene and care in the administration of certain irritating drugs, as Cantharides, Turpentine, etc., it is impossible to do so when it occurs as a complication of the infectious diseases or when of bacterial origin, except in protecting the patient from exposure, etc.

In all cases apply warmth, but without producing sweating. The sick room must be kept at a temperature of 72° to 74° F., and the exposure of the patient to draughts of air, even over the bed, should be carefully guarded against. The patient should remain in bed, between flannel sheets, clothed in flannel until all, or nearly all, the albumen has disappeared from the urine and the other symptoms have abated. In many cases the mere fact of the patient sitting up after the albumen has disappeared from the urine, has caused an exacerbation of the disease and a return of the albumen.

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Warm baths daily, at 100° to 105° F., lasting from five to fifteen minutes, followed by rest and quiet for one or two hours, or hot packs given by wrapping up the patient for one or two hours, in a flannel blanket wrung out of hot water, and repeated once or twice a day, are very necessary to remove dropsical effusions.

In many of the more critical cases, hot air baths are indicated, and are of great service. Air heated by means of an alcohol lamp, placed at the side of the bed, is conducted between the blankets covering the patient through two lengths of stove-pipe with an elbow. The whole body should be daily sponged with tepid water, under the bed clothes, to assist diaphoresis and give comfort to the patient. Dry cups, from two to twelve in number, applied over the kidney region once or twice daily are sometimes useful in relieving the local congestion. Hot boric acid stupes, applied hourly, and covered with oiled silk, are often of great service. The bowels must receive proper attention; if constipation is present, the unloading of the venous capillaries may be produced, and the abdominal circulation decidedly improved by drachm doses of Magnesia sulphate every hour until eight doses have been given, or there is an evacuation. The better way, however, to relieve the constipation and the stagnation of the circulation is to flush the rectum daily with two to four quarts of hot water at a temperature of 102° to 105° F. In many cases a portion of the water is retained, absorbed and excreted by the kidneys.

Milk is the classical food, not only because it

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contains all the body-building principles, but because it seems to possess a diuretic action. It can be varied to advantage with Hudson's food, malted milk, buttermilk, kumyss, matzoon, and usually some animal broths. If uræmic symptoms should appear, nitrogenous food of every description must be avoided. Poland, Stafford, Clysmic, distilled, or any pure water, must be ingested in large quantities, in order to flush the kidneys, and at the same time remove the solid constituents from the blood. In the treatment of acute parenchymatous nephritis, it is important to increase the quantity of the watery and nitrogenous excretions from the kidney, which are usually greatly diminished, and which, if neglected, accumulate in the system, producing headache, convulsions, coma, and dropsical accumulations. Diuretics *(per se)*, while relieving sometimes, as a rule increase the inflammation in the kidney, and do more harm than good. They are as harmful as cathartics in the very acute cases. In productive nephritis, Digitalis, Caffein, Strophanthus, Diuretin, Acetate of Potash, Squilla, etc., may be used in appreciable doses as a makeshift. The hydragogue cathartics, Jalap, Elaterin, etc., sometimes give rapid results, but they cannot be continued, as they will eventually irritate the stomach and exhaust the patient. The arterial tension should at all times be carefully watched, and the timely administration of Aconite, Belladonna, Glonoin, Amyl nitrate, Chloral hydrate, etc.

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will often avert many of the more serious nervous symptoms.

If convulsions occur, Chloroform by inhalation may be given for immediate relief, or rectal enemas containing 10 to 20 grains of Chloral hydrate or 20 to 60 grains of Potassium bromide may be used. When heart failure is imminent, Digitalis, two or three drops of the fluid extract, or Caffein, Strophanthus, Spartein or Glonoin will be required. When all forms of medicinal treatment fail and the cavities of the body are filled with dropsical fluid and the connective tissue is infiltrated to a marked degree, punctures into the dependent parts, or tapping of the cavities, with strict asepsis, will be found necessary.

When the disease is of the exudative variety, as health returns, solid food may be gradually allowed and the usual duties of life resumed; but if it is believed to be of the productive type, the treatment must be continued for months, a warm, equable climate advised, with freedom from mental and physical fatigue, and some light outdoor employment or recreation.

Dr. Reginald Harrison, Medical Record, Nov. 7, 1896, records a number of apparent cures of acute productive nephritis by surgical methods. He gives two conditions in which surgical interference is indicated:

1. Includes those instances in which the kidney complications are, from the onset, of the gravest character and death is imminent. In these cases a fatal termination usually rapidly ensues, the duration of

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life being largely determined by the degree of urinary suppression.

2. A group of cases including those in which, after a limited time, the tendency, so far as the renal symptoms are concerned, is not in the direction of recovery. The amount of albumen does not decrease, tube casts, as well as other evidence of deterioration, are found in the urine, and the quantity of urine excreted is below what may be regarded as a fair average. Tenderness over the kidney on pressure is often complained of.

That many cases of nephritis with high tension and subsequent structural deterioration must necessarily be attended by cardiac hypertrophy is obvious. Diminished capacity of the excreting power of the kidneys can only be compensated for by increase in the force of the blood current. In the restoration of the function of the kidney we have the only safeguard against the development of this complication. In the surgical treatment of renal tension associated with albuminuria, the kidney should be exposed by a moderate incision, so as to enable the operator to feel the organ distinctly, both in front and behind, aided, of course, by the hand of an assistant pressing the abdomen backwards from the front. If in conjunction with the presence of albumen in the urine, the kidney is found to be in a state of tension, three or four punctures should be made in the capsule in various directions. Should the organ be found to be in a higher state of tension, a longitudinal incision

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into the cortex along the convex surface, one or two inches in length, should be made.

If either of these methods has been adopted, a drainage tube should be inserted and the wound lightly packed with Iodoform gauze. The incision should be dressed in such a manner as to provide for the free escape of blood, urine, etc.

CHAPTER X.

Chronic Bright's Disease.

Chronic Bright's Disease will be described in three classes, which are sub-divided into divisions or stages.

1. Chronic Parenchymatous or Productive Nephritis with exudation.

2. Interstitial or Productive Nephritis without exudation.

3. Amyloid or Degenerative Infiltration of the Kidney.

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CHAPTER XI.

Chronic Parenchymatous Nephritis.

Chronic Productive Nephritis with Exudation, Chronic Croupous or Tubal Nephritis, Chronic Glomerulo-Nephritis, Chronic Desquamative Nephritis, etc.

Delafield defines it as a chronic inflammation of the kidney attended with a growth of new connective tissue in the stroma, permanent changes in the glomeruli, degeneration of the renal epithelium, with exudation from the blood vessels, and sometimes changes in the wall of the arteries. It is characterized by dropsy and albuminous urine, both well marked.

Etiology.—It often follows acute productive parenchymatous nephritis, and is frequently caused by the malarial diseases, exposure to cold and damp, especially damp and unhealthy dwellings, grief, worry, etc. In some cases it comes on very insidiously, without apparent cause, especially in middle life, at which period it is most prevalent. It also occurs in certain blood dyscrasias, as rheumatism, gout, etc.

Pathological Anatomy.—The kidneys in their gross appearance show a variety of forms. The most common is a large white kidney, with a white, thick cortex. The cortex, instead of being white, may be mottled red and white or red and yellow.

The kidneys may be apparently normal, except that their capsules are adherent.

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PLATE IV.

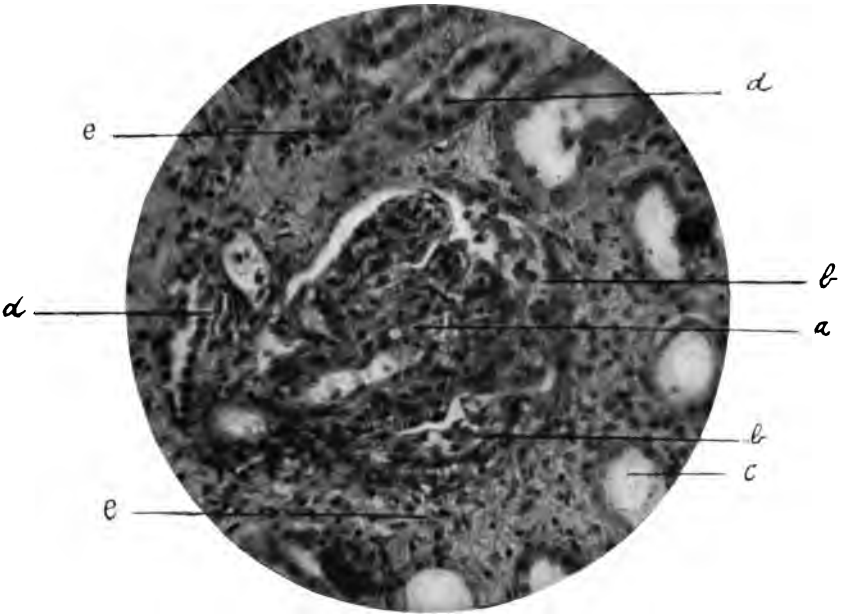

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FIG. 1.

CHRONIC PARENCHYMATOUS NEPHRITIS WITH EXUDATION.

a. Capillary tuft, with growth of epithelium. *b*. Hyperplasia of lining cells of glomerulus. *c*. Tubule, with partially destroyed epithelium. *d*. Tubules, containing exudate and detached epithelium. *e*. New connective tissue growth in stroma.

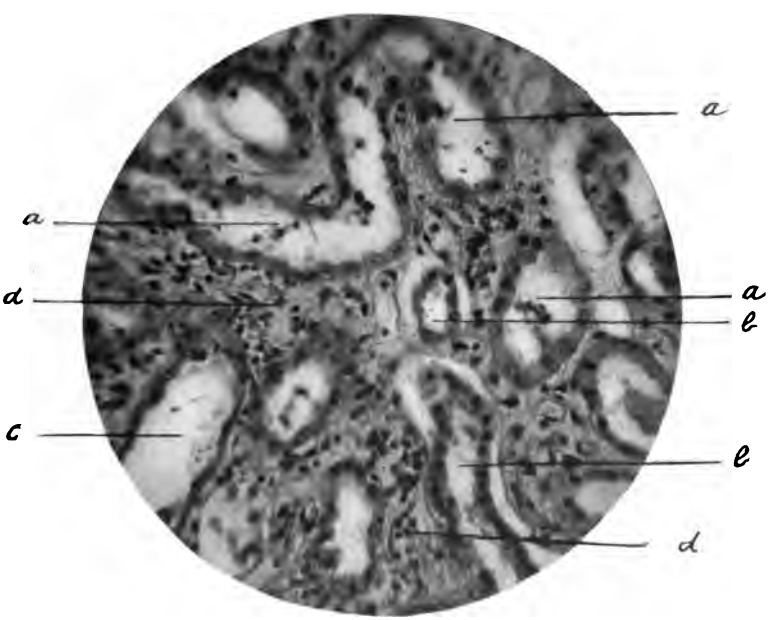

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FIG. 2.

CHRONIC PARENCHYMATOUS NEPHRITIS WITH EXUDATION.

a. Convoluted tubules, with partially destroyed epithelium, containing exudate. *b*. Same as *a*, with epithelium detached. *c*. Tubule, dilated, and epithelium flattened. *d*. New connective tissue growth in stroma.

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They may be small, with a white or red cortex.

The surfaces may be smooth or nodular. The nodules may be large or fine, covering the whole surface.

The capsules are not always adherent, even in some of the small contracted kidneys.

The cortex is often irregularly thickened. In some places it may be thinned and in others so thickened as to obliterate a part or the whole of a pyramid.

In the cortex the growth of connective tissue is abundant, in some portions to such an extent as to cause an atrophy of a large number of tubules.

In other portions of the cortex the tubules may retain their normal size or may be dilated.

The epithelium lining the tubes are in some places flattened and in others swollen. The tubes contain granular matter, fibrin, leucocytes and red blood cells, or they may be empty.

In the glomeruli there may be a proliferation of the lining cells. This proliferation of cells subsequently changes to connective tissue.

There may be a hyperplasia of the cells covering the capillary tufts, often to such an extent as to fill the glomerulus. The glomeruli are sometimes enlarged, and at others atrophied.

The arteries may undergo an inflammation involving all three coats, or there may be a calcareous degeneration of the inner coat.

Clinical History. — It has many symptoms in common with acute productive parenchymatous ne-

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phritis. Its course is chronic, varying from a few months to many years, and frequently follows an acute or sub-acute productive nephritis. In many cases, however, there are exacerbations, the result of excesses, cold, damp, pregnancy, rheumatism, etc.

The dropsy, which varies from a slight œdema of the eyelids, feet and hands, to marked general anasarca, is one of the early—if not the earliest—symptoms noticed by the patient. This dropsical condition, like that in acute parenchymatous nephritis, does not depend upon the anatomical location for its special appearance but may, in different cases, appear in different locations, and may even change its position. It may be so extensive as to cause sloughing of the parts. The effusion of blood-serum into the tissues is due to the same causes which allow of its exudation with the urine. Semmola in 1881 demonstrated that blood-serum in chronic parenchymatous nephritis had a greater power of diffusion than in health or in the cirrhotic form of nephritis.

The second most noticeable and most marked constant symptoms is the anæmia (the accompanying pallor is sometimes described as the statesman's complexion). It is progressive, due to changes taking place in the blood; the red and white blood corpuscles are gradually reduced in absolute and relative numbers, the fibrin remains about normal, while the amount of albumen fluctuates to a considerable degree, but is always much below the healthy average. At the same time the blood is charged with the nitrogenous

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products of alimentation, which the kidneys in their impaired condition have been unable to excrete. This condition of the blood plays an important part in producing the dyspnœa, nausea, indigestion, headache and prostration, which mark the disease. The emaciation, early in the disease, is not noticeable, as the condition of general anasarca obscures it to a great degree, while later, if a condition of atrophy of the kidney is developed, the œdematous condition will somewhat subside, and the emaciation in consequence becomes very apparent.

Micturition is increased in frequency, though the quantity of urine voided during the day will usually be somewhat reduced. The specific gravity of the urine is lowered, generally it is about 1010, due to reduction in the percentage of urea; it may, however, be greatly increased. It is found that in those cases which run a rapid course, that the specific gravity is higher, 1012-1020, than in the more chronic, when it is about 1001-1006. A low specific gravity indicates a large growth of connective tissue in the cortex of the kidney. The acidity of the urine is below the average, albumen is found in abundance, urea is diminished, uric acid is about normal, casts are numerous, the granular variety being considered characteristic of this form of kidney disease, although hyaline, waxy or fatty casts are sometimes found. The hyaline casts may be either large or small, and they, with the lighter colored granular casts, are

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found early in the disease, while later the majority are of the dark, granular, waxy or fatty varieties.

The blood casts and those well covered by epithelium are rarely met with in this form of Bright's disease unless an acute attack of nephritis has supervened. The predominance of certain casts leads us to the diagnosis and the pathological condition of the kidneys. Whenever blood corpuscles, pus and epithelial cells are found in the urine, it is evidence that an acute attack has been added to the chronic inflammation of the kidney tissue. If atrophic changes take place in the latter stage of chronic parenchymatous nephritis, the quantity of urine will be increased and its specific gravity relatively diminished. The heart is rarely affected, cardiac dilatation and hypertrophy are uncommon, and, if present, are not usually noticed during life.

Cerebral hemorrhages and epistaxis are uncommon. Dyspnœa is frequent, it may be of uræmic origin, due to general anæmia or from dropsical accumulations. It may be continuous or transitory, coming on in attacks, especially at night or in the early morning, and is always worse when the patient assumes a recumbent position. Dyspnœa of nephritic origin is very frequent, when it is present and not due to disease of the lungs or heart, the urine should always be examined.

Loss of sight sometimes occurs, due to albuminuric retinitis; it may be transient or permanent, both eyes are usually affected; it may somewhat improve, but

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complete recovery is rare. Headache is a common accompaniment; it may be confined to the fifth pair of nerves or appear as a migraine with nausea and vomiting. In all cases of this class where the cause of these symptoms cannot be found, it would be well to examine the urine.

Rheumatic pains sometimes accompany the œdema of the muscles. They are usually dull but sometimes shooting in character, and are not relieved or aggravated by motion or pressure. Pains in the regions of the kidneys are rare. Anæsthesia of the fingers, usually of the left hand, is sometimes noticed. Fever is never present unless an acute Bright's disease has been added to the chronic condition. Bronchial symptoms are always present in well-marked cases of chronic parenchymatous nephritis. Flatulent indigestion, vomiting and diarrhœa are frequent; the tongue is usually clean. Uræmic convulsions are rare.

This form of Bright's disease is essentially that of middle life, rarely occurring after the fiftieth year.

Diagnosis.—This is usually easy, especially when the generic symptoms are marked—*i. e.*, extensive dropsy, with diminished quantity of the urine of low specific gravity, albuminuria, and an abundance of granular and fatty casts, together with the absence of distinct cardiac lesion. When contraction (atrophy) of the kidney has developed, causing increased cardiac action and consequent hypertrophy, it is sometimes

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impossible to differentiate this condition from the interstitial variety of chronic Bright's disease.

PROGNOSIS.—Unfavorable; complete recovery is rare. The younger the patient, the more favorable the prognosis. That some cases, even when of long standing, terminate in recovery, there is not the slightest doubt, but everything depends on the amount of kidney tissue involved, on the treatment and hygiene advised, and the way it is followed. When of syphilitic origin, the prognosis is favorable; when from scrofula, it is unfavorable. When the relative quantity of albumen is over 1 per cent. by weight, and the number of granular, waxy and fatty casts is large, the prognosis is unfavorable. It is more favorable when the hyaline casts predominate.

TREATMENT.—*Arsenicum* acts well in the chronic nephritis caused by scarlet fever and malaria, and especially in the large, fatty variety. Great anxiety is always present, with great despair, sure they are about to die; rapid sinking of strength, and emaciation; general œdema, beginning with puffiness of the eyes and extremities; palpitation of the heart, cardiac dyspnœa, dyspnœa from œdema of the lungs, increased by lying down, especially recurring at midnight; skin feels cool, while they complain of thirst; water irritates the stomach, and causes vomiting.—All symptoms relieved by warmth.

Cantharides is useful in the early stage of chronic nephritis—relieving the headache, delirium, coma, etc. The urine is scanty, dark, and contains albumen,

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epithelia and casts from the tubuli-uriniferi. Mental stupor; drawing, tearing pains in region of the kidney; lumbar region sensitive to touch; thirst, fluids do not affect the stomach, but they increase the pain in bladder and frequency of urination.

Ferrum muriaticum will be indicated in proportion as the hepatic, digestive and assimilative functions are normal, and the albuminous process is remote from or independent of recent congestion, debility, with pale face that flushes easily, is marked; feeble action of the heart, occasionally losing a beat, together with pain in lumbar region, relieved by walking, aggravated by sitting.

Kali muriaticum. Goodno reports excellent results with this remedy in Bright's disease, with progressive anæmia and prostration. The patient is pale, breathless, with cardiac palpitation, urine scanty, high colored and albuminous.

Mercurius corrosivus. General œdema of the body. Earthy pallor of the skin; anorexia; nausea, with weakness, and tenderness in the epigastric region; pulse quick and feeble, great weakness and prostration, restlessness of the limbs, must change position frequently; perspiration on slight exertion; coma and convulsions. All symptoms worse at night and after sleep.

Nitric acid. Great weakness, especially in the morning. Bright's disease, with gastric disturbances.

Nux vomica. Bright's disease, with digestive disturbances; patient irritable, morose, desires to be alone; symptoms relieved by keeping quiet.

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Phosphorus is invaluable in the stage of fatty degeneration when fatty casts appear in the urine, frequently associated with a weak, empty feeling in the whole abdomen; weakness of memory, etc.

For the acute exacerbations, the remedies already given under acute parenchymatous nephritis must be consulted. For other remedies see Chapter XL.

Hygiene is of the utmost importance. The body should at all times be warmly clothed with woolen or silken under-garments, warm but light in weight, and sufficient to prevent sudden chilling of the surface from rapid atmospheric changes. The patients need not be confined to their beds, though it has been demonstrated repeatedly that the albumen diminishes, and casts in the urine become less numerous, when from any cause nephritic cases are compelled to remain in bed. When possible removal to a warm equable climate is to be recommended where moderate outdoor exercise can be allowed without endangering their health. When this is impossible, the patient should remain indoors in inclement weather. Moderate exercise of body and mind should be encouraged, and regular and sufficient sleep taken, but excesses of all kinds must be avoided.

A strict milk diet is frequently of great benefit, though few will follow it for any length of time. Germain Sée advises the ingestion of large quantities of milk, from two to four quarts daily; he says that albumen frequently disappears under this regimen, and does not return when a more generous diet is

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allowed. The usual practice is to advise a moderate daily allowance of milk, with a mixed though somewhat selected diet. Hale White says an ordinary full diet, in his experience, does not increase the tendency to uræmic symptoms. Highly-seasoned food, smoked meats and alcohol in all forms must be forbidden. We should, however, always remember that, in this form of chronic Bright's disease, the condition of the kidneys is such that their secreting power is impaired, and they cannot be expected to do their usual quota of work, consequently a diet which will produce the smallest amount of urea, sustain the strength of the patient, and at the same time build tissue, should be chosen. Physiology teaches us that the amount of urea secreted is always in proportion to the quantity of nitrogenous food ingested; it is, therefore, evident that this class of food should constitute only a small or very moderate proportion of the daily aliment. Experiments have proved that non-nitrogenous food reduces the daily quantity of urea secreted, and increases the quantity of watery elements, it should, consequently, be advocated in order to reduce the quantity of urea and increase the amount of water. A large portion of the residue of the carbo-hydrates are expelled by the bowels and the skin—they can, therefore, be allowed in generous quantities.

Hirschfield allows as a typical daily diet in this disease, six ounces of meat, thirteen ounces of bread, a liberal allowance of vegetables and fruit, one and a half ounces of sugar, and five ounces of fat. When

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the urine becomes scanty and high-colored, with more or less sediment, an increase in the quantity of water ingested will be of positive benefit, not only by increasing the quantity of urine, but it also washes out the secreting portion of the kidney. The waters usually recommended are Poland, Stafford, Waukesha, Clysmic, Hygeia, or any other pure or distilled water. In some cases saline waters will be required. The dropsical condition may frequently be relieved by the appropriate remedy, but the hot air bath or pack are sometimes required. A warm bath at bed-time, beginning at a temperature agreeable to the patient, gradually brought up to 105° F., and continued from ten to twenty minutes, causes a diminution of the dropsical accumulations, and in a few hours increases the flow of urine.

Morning sponge-baths, followed by general friction, are beneficial. Acute exacerbations are to be treated on the principles advised for acute parenchymatous nephritis.

The condition of the heart, pulse and respiration deserve special attention. Whenever the pulse indicates increased arterial tension and it cannot be relieved by the selected remedy, we can on physiological grounds prescribe Nitro-glycerin, Chloral hydrate, Morphia, or Potassium iodide. If this condition is neglected or passes unnoticed, vomiting, headache, dyspnœa and convulsions will soon appear. The administration of Opium is admissable only when tension of the arterial system is present. Should the dropsical con-

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dition persist in spite of treatment, it may be necessary to give from one to four teaspoonfuls of the Infusion of Digitalis, freshly prepared from English leaves, every three or four hours: two-drop doses of the tincture of Apocynum cannabinum every hour, or preferably, a teaspoonful of the infusion of the fresh root. Pilocarpin has sometimes been of benefit, but it is decidedly contra-indicated where heart weakness to any degree is present.

Large dropsical accumulations may require removal with the aspirator, or by scarification, under strict asepsis, of the cellular tissue in the most dependent portions of the body.

Dyspnœa, caused either by arterial tension or dropsical accumulations, is usually amenable to drug treatment.

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CHAPTER XII.

Interstitial Nephritis.

Renal Cirrhosis, Renal Sclerosis, Granular Atrophy, Red Granular Nephritis, Gouty Kidney, Chronic Interstitial Nephritis, Contracted Kidney and Catarrhal Nephritis.

Delafield defines it as a chronic inflammation of the kidney, attended with a new growth of connective tissue in the stroma, permanent changes in the stroma and glomeruli, degeneration of the renal epithelium and sometimes changes in the walls of the arteries.

It has usually been considered pre-eminently an insidious and chronic disease, but later investigations demonstrate it to be in many cases of catarrhal origin and acute in nature. Virchow says: "There is first infiltration of the connective tissue, with cloudiness and swelling of the epithelium, followed by desquamation, the œdema being most marked between the cortical and pyramidal substances."

Etiology.—Under the old pathology, the cause in the majority of cases was believed to be obscure or undiscoverable, but with the more perfect knowledge gained by careful investigation, it is apparent that cold, exposure and dampness play an important part in the cause of interstitial nephritis, the symptoms of which are so slight and trivial in the early stages that they frequently pass unnoticed.

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It was believed by many authors that indulgence in alcoholic beverages were the prime factor in the causation of this disease, but statistics prove beyond a question that interstitial nephritis occurs less frequently with those who take alcohol in moderation than with the strictly temperate; yet there are cases when the system has been saturated with alcohol, causing cirrhosis of the liver, where the autopsy has given evidence of an associated contracted kidney.

Climate has its effect; the disease is essentially one of the temperate zone; it is of infrequent occurrence in the frigid, tropic or sub-tropic regions; this may be accounted for by the sudden atmospheric changes common to the temperate zone.

Malarial poisoning is a very potent cause, not only on account of the congestion occurring during the paroxysm, and irritation caused by the excretion of the bile-acids, but because the attacks are repeated.

Pregnancy has been the cause of many undoubted cases of acute and chronic interstitial nephritis; the chronic condition being due frequently to the neglect of treatment during this critical period.

Syphilis is especially a cause of interstitial nephritis, when its early treatment has been unsuccessful or neglected. In these cases the round cell formation in the interstitial connective tissue may be general. The disease has even developed in persons suffering from hereditary syphilis.

Gout is a prime factor in the causation of interstitial nephritis. Continental authorities, however, re-

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serve the name of gouty kidney to those cases of interstitial nephritis in which there is a deposit of urate of soda in the pyramids of the kidney and along the tubules, giving on section a striated appearance; the microscopic change, however, is the same in all cases, barring this one point, and they both result in a condition which will not allow uric acid to be secreted by the kidneys, while urea, on the other hand, is secreted without difficulty.

The ingestion of lead may also produce all the pathological changes of interstitial nephritis, and in cases of lead poisoning the kidney will usually be found involved. In many cases, though not suspected during life, in those who have worked in the Arts requiring lead, and death has been due to some other cause, if an autopsy was made, marked evidence of interstitial nephritis has frequently been found. In looking for lead as a cause of interstitial nephritis, we must not only search for it in professional painters, etc., but we must remember that there is sufficient soluble lead in many of the drinking waters delivered through lead pipes, to produce the disease in those who are susceptible, especially when the water abounds in chlorides, nitrates, etc.

Heredity acts as a cause, and cases have followed in families for generations; perhaps it is due as much to hereditary weakness of the parts as to inherent family weakness, the nephritic disease being precipitated on the appearance of some of the exciting causes already mentioned.

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AGE.—As gathered from statistics, the time of life in which this form of kidney disease is most common is between the thirtieth and sixtieth year, though it may occur at any time; a few cases have been recorded as having occurred before the fifth year. It may be considered a disease of manhood and advancing age. It occurs frequently in those weighed down by anxiety and business cares, and therefore the question might arise as to which of the last two causes mentioned were the most potent in the causation of this condition, especially when statistics show that the disease is much more common among the male than the female; in the proportion of two to one.

Cystitis, acute and chronic; prostatitis, simple or hypertrophic; strictures of the urethra or ureter; calculi in the bladder, in the pelvis of the kidney, or in both, may, by their presence, cause congestion and inflammation, which, extending by contiguity of surface as well as by the interference with the urinary flow and genito-urinary circulation, will, in time, cause nephritic inflammation, usually of the interstitial variety. Valvular lesions of the heart, by change in the arterial tension, are also factors in the production of this disease. By some it is believed to be due to a general arterial tension with resulting renal sclerosis, while others maintain that the renal obstruction is the original cause, and the general arterial tension follows it. Hypertrophy of the left ventricle always occurs in this variety of renal disease.

PATHOLOGICAL ANATOMY. — The kidneys are as a

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rule small, with roughened surfaces and adherent capsules. They may be normal in size and even large, but their surfaces are rough and capsules adherent. The cortex is thinned, and gray or red in color.

The growth of connective tissue in the cortex is abundant and appears in irregular patches.

In the cortex the tubes are atrophied or dilated. In some of the dense masses of connective tissue they may be completely obliterated.

Their lining epithelium is flattened. Some of the tubes contain hyaline material, epithelium, fibrin and leucocytes; some are greatly dilated, being almost cystic in their appearance.

Many of the glomeruli are atrophied, some are larger than normal. There is a hyperplasia of their lining cells and the epithelium covering the capillary tufts.

There is a generally diffuse connective tissue growth in the pyramidal portion.

In some parts of the kidney the characteristic appearance of the organ may have given way completely to the excessive connective tissue growth.

Clinical History.—Of all inflammatory diseases of the kidneys none show such insidious development. The disease is rarely suspected by the patient or the physician until its presence is well marked or a uræmic convulsion or apoplectic seizure announces its presence. In the acute stage it is not often diagnosticated and the patient rarely calls upon his physician with this condition in mind, but usually to be relieved of some secondary

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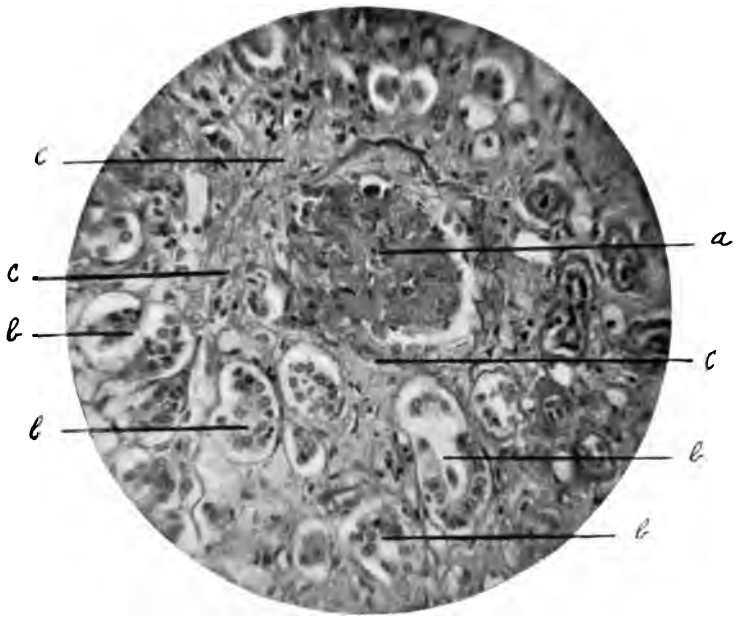
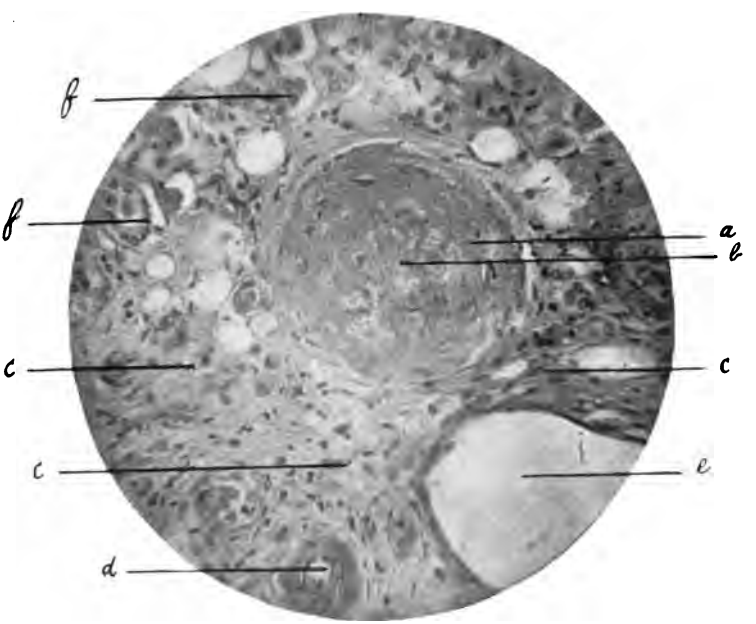
PLATE V.



(MAGNIFIED 450 DIAMETERS.)

CHRONIC INTERSTITIAL NEPHRITIS.

a. Capillary tuft, and atrophied glomerulus. *b*. Atrophied tubules, with detached epithelium.
c. Connective tissue growth.



(MAGNIFIED 450 DIAMETERS.)

CHRONIC INTERSTITIAL NEPHRITIS.

a. Atrophied glomerulus. *b*. Faint remnant of capillary tuft. *c*. Connective tissue growth.
d. Atrophied tubule. *e*. Dilated tubule, with flattened epithelium.
f. Atrophied tubules, with detached epithelium.

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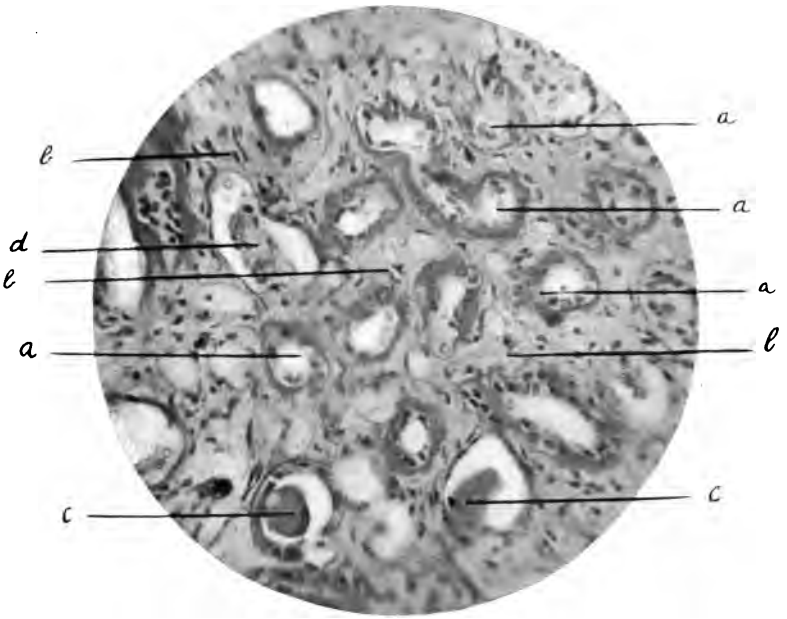
PLATE VI.



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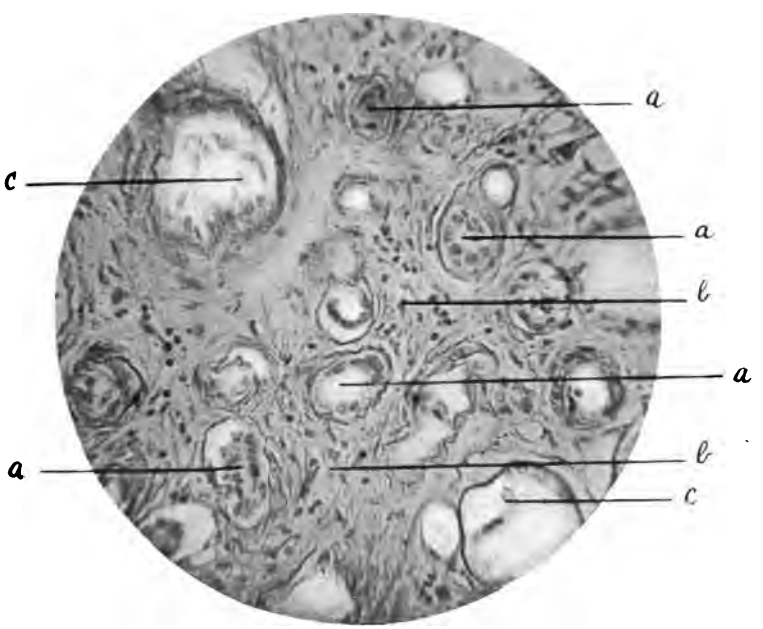
CHRONIC INTERSTITIAL NEPHRITIS.

a. Atrophied tubules. *b.* Connective tissue growth. *c.* Hyaline masses in tubules. *d.* Detatched epithelium, imbedded in hyaline material.



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CHRONIC INTERSTITIAL NEPHRITIS.

a. Atrophied tubules. *b.* Connective tissue growth. *c.* Detached epithelium.

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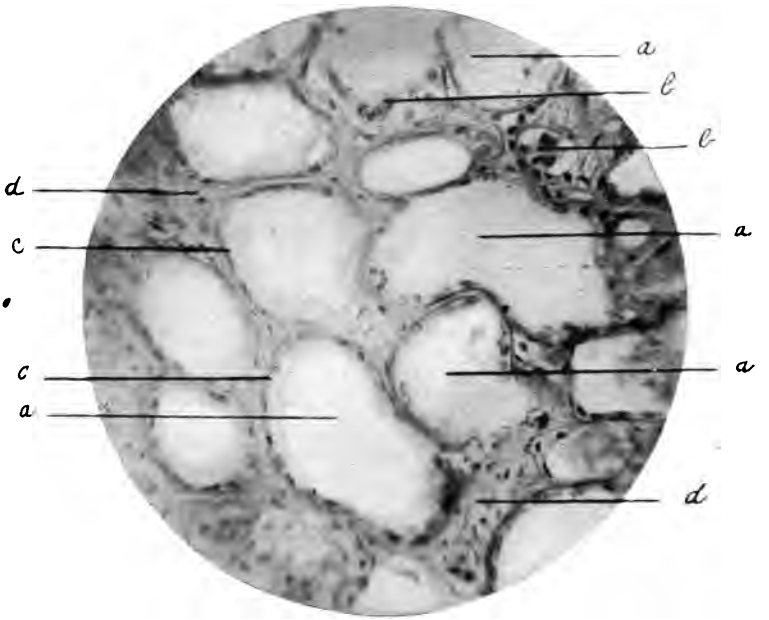
PLATE VII.



(MAGNIFIED 450 DIAMETERS)

FIG. 1.

CHRONIC INTERSTITIAL NEPHRITIS.

a. Dilated tubules. *b*. Detached epithelium. *c*. Flattened epithelium.
d. New growth of connective tissue in stroma.

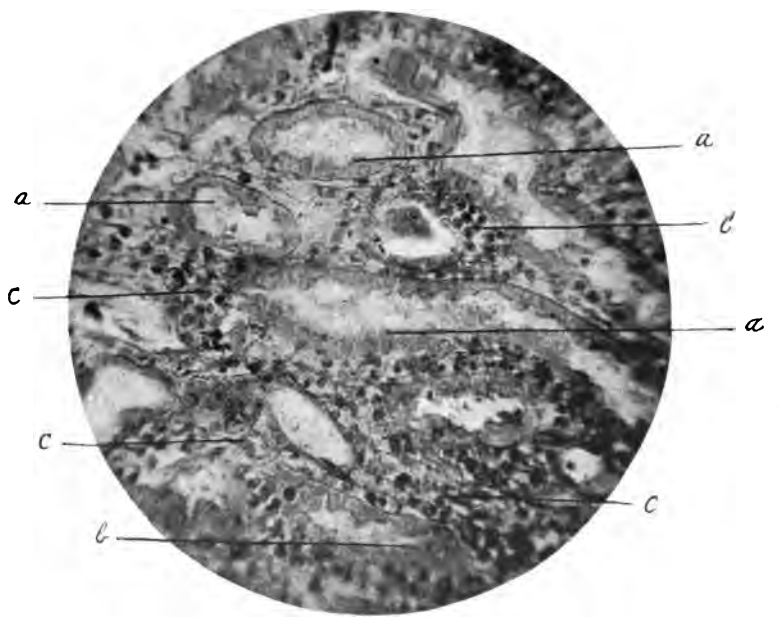


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FIG. 2.

SUPPURATIVE NEPHRITIS.

a. Tubules, with degenerated epithelium. *b*. Tubule, filled with pus.
c. Stroma, infiltrated with pus.

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symptom, the result of cardiac hypertrophy, as palpitation of the heart, dyspnœa, etc.

This variety of kidney disease is characterized, when well advanced, by its associated hypertrophy of the left ventricle of the heart, headache, temporary amaurosis, gastro-intestinal disturbances, and general debility.

The disease may continue for years without specially lowering the general tone of the body; in fact, even when fully developed the patient may enjoy comparatively good health, the power of endurance, however, gradually wanes and general debility slowly asserts itself, with wasting of the muscular and adipose tissues which, early in the disease, may apparently hold its own. The complexion becomes sallow and anæmic, and headaches become frequent. For this reason in all cases of persistent headache which are not readily explained by other causes, rigid and frequently repeated examination of the urine should be made for evidences which might indicate an interstitial nephritis. The headaches are persistent and are often so severe as to almost drive the patient out of his mind, and are usually accompanied by dull, deep muscular pains referred to various parts of the body; sometimes confined to the back of one leg and therefore frequently incorrectly ascribed to sciatic rheumatism. As the disease advances, the gradual obstruction to the circulation through the kidneys from the progressive contraction of the kidney tissue and complicating arteritis, causes a gradual increase of the cardiac hypertrophy. The hypertrophy of the left ventricle has much to do with the causation of

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the general symptoms, as well as the condition of the urine.

As the heart responds by increased hypertrophy to the calls made upon it by the damaged kidney, the headaches from arterial tension become more continuous and the mental symptoms more pronounced. The patients become radically changed in disposition.

The cardiac hypertrophy, however, prevents dropsical conditions, and ascites is consequently rare in interstitial nephritis. Even a slight swelling of the eyelids, feet or hands is rare, unless the heart becomes weakened from some other cause, as over-anxiety, over-work, etc., but when hypertrophy ceases to compensate and dilatation of the heart occurs, the case being about to terminate fatally, dyspnœa and dropsical conditions similar to those in chronic parenchymatous nephritis develop. Interstitial nephritis is frequently associated with endocarditis and may remain undiscovered until marked changes have occurred in the valves, etc.

As the disease develops the urine gradually becomes more abundant — pale, clear, or foamy, is acid in reaction; the specific gravity varies from 1000 to 1016 or even 1025. The relative quantity of urea is diminished, but the total quantity for the day usually averages about normal; the ability to secrete uric acid is gradually lost, so that in the later stages no uric acid is eliminated by the kidneys. Casts are infrequent or absent; when found they are of the small hyaline or light granular varieties, with an occasional leucocyte or epithelial cell attached to them; the

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large hyaline casts are sometimes present. If, from any reason, an acute nephritis is engrafted upon the original disease, a few blood corpuscles may be found. Early in the disease the only evidence of interstitial nephritis may be a few epithelial cells from the convoluted tubes of Henle. Later on, as the heart weakens, the casts become more numerous and of greater variety, as occurs in the contracted kidney of chronic parenchymatous nephritis. In the early period of this disease albumen is rarely discovered in the urine, and later when found is transitory; frequently it is absent or undiscoverable for weeks or months by the most delicate tests; hence the necessity for careful and long-continued search in all suspected cases of interstitial nephritis before a positive-negative diagnosis is made. It is not uncommon for a case of well developed interstitial nephritis to terminate fatally without albumen having been discovered in the urine, even after the most careful chemical examination. The amount of albumen never exceeds one per cent. by weight.

The urine is greatly increased in quantity, due to the increased arterial tension necessary to force the blood through the Malpighian bodies which remain intact, many being destroyed by the contraction of the newly formed tissue: with the increased secretion of urine there is an increased frequency of micturition, especially noticeable at night. The pulse is always hard, tense, full, and wiry.

The cardiac hypertrophy is progressive and produces palpitation, causing much annoyance to the patient—it

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may pass unnoticed. As the disease advances, unless life is extinguished by some extraneous cause, dilatation finally occurs, and after a varied train of symptoms, some uræmic condition will cause a fatal termination.

Hemorrhages into the brain, or from the nose, stomach, etc., are frequent in interstitial nephritis; one in every sixteen die from cerebral hemorrhages, the reason of this pathological condition being the increased blood tension. About one-half of all cerebral hemorrhages are due to recognized or unrecognized interstitial nephritis, resulting from the weakened condition of the vessels and especially the development of small milliary aneurisms, which Charcot says are frequently developed in interstitial nephritis, as well as to the diminished or want of coagulability of the blood; hemiplegia, with or without aphasia, may be the first condition to call attention to the kidney lesion.

Autopsies have not revealed any increased thickening of the cranial bones. The effect upon the eye is very marked, not only in the albuminuric retinitis that is frequently noticed by the opthalmologist long before other rational symptoms can be discovered, but also by a temporary amaurosis which may appear and disappear from time to time without apparent physical lesions. Uræmic symptoms are very common in this form of Bright's disease.

Epileptiform seizures and muscular twitching occur; convulsions may appear, also insanity, but whether caused by the nephritis or the mental condition is as yet unknown, in some cases, however, the mental

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aberration has borne a special relation to the nephritic symptoms. Delirium, stupor or coma may develop rapidly or slowly.

As the disease progresses dyspnœa appears, sometimes as transitory attacks lasting for a few minutes or hours, and are liable to be produced by mental or physical fatigue or excitement, and to occur in the morning and pass off towards night; uræmic symptoms gradually become more marked, and coma, convulsions, etc., finally cause death.

The sexual appetite progressively diminishes as the disease advances. Bronchitis and other chronic respiratory diseases are common complications of interstitial nephritis. The most serious complication is pericarditis.

Diagnosis.—It may be impossible, in the early stage of interstitial nephritis, to make a positive diagnosis, but a careful and persistent examination of the urinary sediment, even if it is slight in amount, will usually reveal epithelial cells from the secreting parts of the kidneys, which are pathognomonic of commencing interstitial nephritis. There is but one layer of these cells, and when desquamated they are never replaced; their position afterwards being occupied by endothelium, which is rarely thrown off, and is consequently not found in the urinary deposit. The microscope must be our main dependence for the early recognition of this disease. In contracted kidney following parenchymatous nephritis, there is an abundance of albumen, and casts are numerous; dropsy is well marked;

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cardiac hypertrophy may or may not be present; if it is, the urine will be abundant and the dropsy slight. In interstitial nephritis cardiac hypertrophy is marked; casts are few in number, usually of the hyalin or light granular variety; dropsy is absent; urine abundant, and the albumen insignificant in amount.

In the large white kidney, the urine daily secreted is less than normal; the specific gravity is possibly increased; albumen is abundant, and the dropsy marked. There is no enlargement of the heart.

PROGNOSIS.—Unfavorable for recovery, favorable as regards the prolongation of life, provided the amount of tissue involved is limited; the progress of the disease is greatly dependent on the hygiene and mode of life. When compensatory hypertrophy gives place to dilatation the end is not far off.

TREATMENT.—*Arsenicum* is indicated in interstitial nephritis of malarial origin, or in the productive nephritis following scarlet fever, with hypertrophy of the left ventricle; cardiac asthma, aggravated on lying down, the paroxysms occurring especially about midnight; tingling in the fingers, particularly of the left hand; restlessness, anxiety, thirst for small quantities of water, which may be immediately rejected; rapid sinking of the vital forces.

Aurum muriaticum. Urine clear, copious, slightly albuminous, with few casts; cardiac palpitation, pressing pain or feeling of heat in the lumbar region, extending to the bladder, and down the sides; oversensitiveness to pain; hypochondriac, quarrelsome,

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general weakness, with gastric and hepatic disturbances.

Glonoin. Polyuria, urine of low specific gravity, violent heart action, great arterial tension, painless throbbing in all parts of the body, face bright red, puffy, cerebral hypræmia, pain in head aggravated by motion, relieved by external pressure. This remedy has given great relief in arterial tension, uræmic headaches and cardiac asthma; it also reduces the quantity of urine secreted.

Kali iodide. When due to syphilis this remedy acts well. The symptomatic indications are darting pains in the kidney region, burning pains in the lumbar region with difficulty in walking, urine clear and copious, especially at night, urea diminished.

Lithium carbonicum and *benzoicum* have been of much benefit when the interstitial nephritis was of gouty origin.

Mercurius dulcis. This preparation of mercury seems especially adapted to interstitial nephritis, and is the variety that should be administered whenever mercury is indicated.

Nitric acid. Interstitial nephritis with copious, pale urine of low specific gravity, and general symptoms of atonic gout. It is characterized by great weakness and prostration, especially in the morning, with pains of a pressing character in the lumbar region.

Nux vomica. Interstitial nephritis with gastric disturbances. Polyuria, nausea, vomiting, and the mental characteristics of this remedy.

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Plumbum metallicum. Marked tendency to uræmic convulsions, uric acid diminished, clonic spasms of the muscles of the face and extremities, dropsy slight, urine slightly albuminous, mental depression, amaurosis, etc. For other remedies with their symptomatic indications, see Chapter XL.

When the disease is early recognized—that is, before marked interstitial contraction of the kidney tissue has taken place, and compensatory hypertrophy of the heart occurs, life can be prolonged, and possibly a cure may result, but all depends upon the patient, the advice, and the manner in which it is followed. After contraction of the kidney tissue has taken place, palliation only with prolongation of life can be promised or reasonably looked for. In those cases which promise a cure, we must have first a good general constitution and family history to start with. If the patient is obliged to reside in the temperate regions, and is worried by the anxieties of active business life, or indulges in excessive manual labor, relief cannot consistently be looked for. A dry, equable climate is to be advised, and in many cases a sojourn in the southern climates during the winter months, so as to avoid as much as possible sudden atmospheric changes. If unable to make this change, and out-door exercise is allowed, when the weather is inclement the patient should be confined to the house, or possibly remain in bed. Experience has shown that in many cases albumen is reduced or entirely disappears from the urine when the patient

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from any cause has been confined to his bed; hence the advisability of the patient keeping in bed for some days until the albumen disappears; and if at any future time it returns the bed treatment should be repeated.

Dry, hilly climates, when warm, are more favorable than mountainous and seaside resorts, but the mistaken idea of sending patients to health resorts in the last stages of any disease is unadvisable and cruel in the extreme; it removes the patient from his family, with the deprivation of the usual comforts of life, and substitutes an unsatisfactory and unpalatable dietary, with possibly poor hygiene, and would be sure to hasten the end they are trying to postpone. But when climatic changes are properly advised and adhered to, there is no doubt they have much influence in retarding the progress of the disease.

The patient should wear proper and seasonable clothing; silk or woolen underclothing should be worn at all times. Hot air and steam baths are beneficial, but when the general cardiac tone is below the normal, they must not be used sufficiently to weaken the patient. The hot wet pack is frequently of benefit, but cold baths and sea bathing must always be prohibited. Sponge baths, followed by brisk friction of the surface, twice a week, are to be recommended. Mental and physical fatigue, anxiety and worry increase the severity of the symptoms; everything that increases the action of the heart must be avoided. The heart tone must be maintained at all times, yet it must not

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be over-stimulated or headache, cerebral hemorrhages, epistaxis, etc., will be the result.

The diet must be nutritious, but not so nitrogenous as to increase the work of the already damaged kidney. The classical diet is undoubtedly milk in some form, as it also has the power of reducing the quantity of of albumen and increasing the quantity of urea secreted. Some thrive on a milk diet, while others are unable to take it for any length of time. When large quantities of milk are daily ingested, say two to four quarts, it can be varied somewhat by adding a little salt, flavoring it with some palatable extract, peptonized, or taken in the form of a milk lemonade after peptonizing, mixed with vichy or lime water, or as kumyss, matzoon, or even ice cream, etc.; the ingestion of the fatty foods must be encouraged. When the plain milk diet causes muscular fatigue, some require the addition of a little farinaceous food. When this occurs, or indications of its approach announce themselves, more animal food must be allowed. Those who cannot tolerate the milk diet sometimes do very well on animal broths, fish (salmon and lobsters excepted), veal and lamb, chicken, fowls in general, game and vegetables; eggs, as a rule, should be avoided, and sugars and starches restricted; others do well on a general mixed diet, but after all, each case is an entity by itself. When headache, nausea, etc., announce the approach of uræmic conditions, the animal food must be reduced. When animal diet is necessary, the white meat is less objectionable than the red.

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If the interstitial nephritis is the result of syphilis, some of the anti-syphilitic remedies will be required, as Mercury, Potassium iodide, etc.; if of a gouty origin, Colchicum may be indicated. The dyspnœa will require Nitro-glycerine or Chloral hydrate to dilate the arteries and control the heart.

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CHAPTER XIII.

Amyloid Nephritis.

Lardaceous or Waxy Kidney, Depurative Infiltration of the Kidney, etc.

Etiology.—It is always dependent upon some constitutional disease, and its course will depend upon the original excitant. It is frequently the result of chronic suppuration and ulceration as in the third stage of phthisis pulmonalis; ulceration and necrosis of the bony tissue in Pott's disease; chronic ulcers of the leg and in the tertiary stage of syphilis. In syphilitic cases it usually exists as a waxy infiltration of a contracted kidney. When the disease arises from other than syphilitic causes, there is no associated renal contraction. This infiltration is due to some chemical change in the constituents of the blood, and it appears first as small deposits in the minute vessels of the kidneys and other organs. This disease develops most frequently between the twentieth and fiftieth year of life, and more often in the male than the female.

Pathological Anatomy.—The lesions which exist in this form of nephritis are the same as those found in chronic parenchymatous nephritis with exudation.

In addition, the walls of the capillaries in the tufts of the glomeruli undergo amyloid degeneration. The cells covering the capillaries are swollen and increased in number.

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CLINICAL HISTORY.—Amyloid changes in the kidney develop simultaneously with like changes in the liver, spleen, intestines, thyroid gland, etc.; its distinctive clinical history is somewhat marked. It rarely occurs alone, but is associated with parenchymatous and occasionally with interstitial nephritis. The disease develops slowly, the subject becomes emaciated, the urine gradually increases in quantity and sometimes reaches, in a well marked case, one hundred ounces per day; the specific gravity ranges from 1003 to 1012. Albumen is abundant, but in the early stage the quantity of albumen is small in amount, is not persistent, and the quantity of urine daily excreted may be about normal, occasionally a little below the average. The urinary sediment is small, and casts are infrequent; when present they are of the hyaline variety, with an occasional large waxy cast, which gives the characteristic reaction with iodine. Sometimes we may find red and white blood corpuscles. If a decided parenchymatous nephritis is associated with this condition, the quantity of urine excreted will be less and the casts will be more numerous and of greater variety. There are no associated cardiac lesions in this condition of the kidney, hence no hemorrhages, headaches, dyspnœa, etc.

Dropsy is usually present. It is persistent and appears particularly in, or may be confined to the lower extremities and abdomen. The dropsy and the increased quantity of urine are characteristic of amyloid nephritis, and are usually accompanied by diarrhœa

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which is intractable in character. Vomiting may also occur; uræmic symptoms are rare. The anæmia is due more to the general dyscrasia than to any special lesion of the kidney.

DIAGNOSIS.—When the disease is associated with, or engrafted upon, some other kidney disease, it is almost, if not quite, impossible to make a positive diagnosis until the autopsy, and the lesion is confirmed by the characteristic chemical reaction of the tissues, but in uncomplicated cases the diagnosis depends upon the large amount of urine, its low specific gravity, the accompanying dropsy and diarrhœa, with the absence of cardiac hypertrophy and uræmic symptoms.

PROGNOSIS.—This disease being a sequela of, and dependent upon, other diseased conditions of the system, and showing itself in other organs at the same time, may be looked upon as progressively fatal, although many years may elapse before death occurs.

TREATMENT.—*Kali iodide* will be required for amyloid nephritis of specific origin, accompanied by darting pains in the renal region, or a feeling as if the back was being squeezed in a vise; urine clear, copious, especially at night.

Lycopodium is very frequently indicated. The characteristic digestive symptoms are usually marked, due to the amyloid involvement of the mucous membrane of the stomach and intestines. All symptoms are worse from 4 to 8 P. M.

Nitric acid. Great weakness, pressing pains in

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lumbar region, gastric disturbances, fetid breath, and obstinate diarrhœa.

Phosphoric acid. Mental indifference, pains in back, nutritive disturbances; also indicated for the hectic fever and evidences of suppuration in other parts of the body, with which this disease is so frequently accompanied. For other remedies, see Chapter XL.

The general treatment will vary with the cause of the disease. A generous diet is always indicated.

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CHAPTER XIV.

Cystic Degeneration of the Kidney.

ETIOLOGY. — This condition may be congenital or acquired. Those belonging to the congenital variety rarely live to the end of their first year. Virchow considers this form due to imperforate uriniferous tubes. Many die in utero, though occasionally life is prolonged to advanced years. In adult life, it is frequently associated with chronic interstitial nephritis, sometimes it occurs without apparent cause, between the fortieth and sixtieth year, usually accompanied with similar change in the liver and bronzing of the skin. Cystic degeneration of the kidneys is divided into five varieties: first, cysts associated with chronic interstitial nephritis; second, general cystic disease without associated nephritis; third, simple, solitary cysts; fourth, hydatids; fifth, dermoid cysts.

PATHOLOGICAL ANATOMY.—In the congenital form both kidneys are very much enlarged, the left being usually considerably larger than the right. The whole organ is an unshapely, irregular mass of cysts, crowded together and separated by connective tissue. *(See Plate.)* In some places the interspace between the cysts is composed of renal tissue, which microscopically may appear normal or characteristic of a chronic interstitial nephritis. The cysts are made up of a fibrous capsule varying in thickness, lined with flat epithelium. They contain a

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PLATE VIII.

CONGENITAL CYSTIC DEGENERATION OF THE KIDNEY.

From a specimen in the museum of the Metropolitan Hospital, New York
(Photograph one-third size.)

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light yellow fluid, which contains urea and the salts normally found in the urine.

The acquired form.—Occasionally in otherwise normal kidneys are found cysts, varying in size from that of a pin-head to that of a large bean. They are found throughout the cortical portion, between the pyramids, or on the surface immediately beneath the capsule; the circumference of the cyst bulging out and at times giving the kidney the appearance of being lobulated. The kidney tissue surrounding these cysts may be compressed, and some of the more approximate tubules obliterated. They have a thin connective tissue capsule, are lined with flattened epithelium, and contain a thin watery fluid.

In the atrophied kidneys of chronic parenchymatous nephritis without exudation, some of the tubules are dilated to such an extent as to form cysts. These are seldom large, but may attain a size visible to the naked eye.

Hydatids of the Kidney.— Generally the left kidney is affected. The cyst may grow between the organ and its capsule, or in the kidney tissue. They may undergo an inflammatory process, adhesions, and inflammation may follow, and the cyst break into the intestine or surrounding soft parts. They may degenerate into a calcareous mass, consisting of phosphate of lime, cholestrin and fat.

Small hydatids may rupture spontaneously into the pelvis of the kidney, the contents being discharged by the urinary passages.

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CLINICAL HISTORY.—This is obscure and in many cases, even when the autopsy shows marked cystic degeneration of the kidney, the condition has not been suspected during life. There is usually pain in the lumbar region, and hæmaturia is occasionally present. Arterial tension and cardiac hypertrophy are generally absent. Dropsical conditions sometimes appear, but they cannot be differentiated from those occurring in chronic interstitial nephritis. Occasionally on examination of the renal region by palpation, the enlarged kidney can be discovered and sometimes differentiated. Death occurs in the same manner as in interstitial nephritis, from cerebral hemorrhage, suppression of the urine or uræmia, principally the latter.

Hydatid cysts of the kidney are very rare in America, but are frequent in Iceland and Australia. About one-fifth of all hydatid cysts found in the human body occur in the kidney. They are of more frequent occurrence in the male than in the female, probably due to his more intimate association with his friend, the dog. The left kidney is more frequently involved than the right.

Small hydatid cysts may rupture into the urinary tract and be discharged with the urine, without their existence having been suspected. In some cases they become so large that they interfere with the functions of the kidney and encroach upon the neighboring organs, and their discovery becomes proportionately easy. As a rule, hydatid cysts develop in the substance of the kidney, but they may be situated be-

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tween the capsule and parenchyma. It is said that they can be recognized by their characteristic fremitus on manipulation, but the proper way is to aspirate and examine the cystic fluid for the hooklets. It should, however, be remembered that the simple puncture of the sac for diagnostic purposes has resulted in death, due to the escape of the poisonous contents of the cyst into the puncture tract. Inflammation with adhesion sometimes occurs between the sac and a neighboring part, followed by rupture into some of the natural outlets of the body, and may terminate in recovery, or, opening into a closed cavity, cause death.

Dermoid cysts of the kidney have never been demonstrated in a human being.

TREATMENT.— For remedies, see interstitial nephritis and Chapter XL. If one kidney only is involved and a cystic condition can be positively diagnosticated, a nephrotomy, with proper drainage, may be made; sometimes the size of the cyst may necessitate a partial or complete nephrectomy; otherwise the treatment must be on the same general principles advised for chronic interstitial nephritis. If the cyst is of a hydatid variety, either a nephrotomy and enucleation of the cyst, or a nephrectomy will be indicated.

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CHAPTER XV.

Albuminuria or Eclampsia of Pregnancy.

Etiology.—In the latter months of pregnancy, albuminuria, convulsions, etc., sometimes occur, with serious after-effects, and not infrequently with fatal termination; this is true in primiparæ, and especially in twin-pregnancy. The most severe manifestations show themselves during labor or immediately afterwards. In multiparæ, the symptoms are less severe, but there is a greater tendency for the condition to terminate in a productive form of nephritis.

Many explanations have been offered as to the cause of this condition; all are apparently defective and none have been universally accepted.

Pathological Anatomy.—There is no special and characteristic kidney lesion. It has developed when the kidneys were normal, when in a state of acute degeneration, acute parenchymatous nephritis of the exudative or productive varieties, in chronic parenchymatous or interstitial nephritis, and in cystic degeneration.

Clinical History.—This disease may practically be divided into three varieties; first, a small class where albumen may or may not have been present in the urine, and where from some unknown cause the urine becomes highly albuminous, greatly and suddenly reduced in quantity, even verging on suppression, with great deficiency in the quantity of urea excreted, together

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with marked cerebral symptoms, convulsions, stupor, coma, vomiting, deficient vision, headache, arterial tension, rise in temperature, etc., all or a portion of these symptoms being present in a given case, which, if not quickly relieved, result in death. If the treatment is successful, the cerebral symptoms gradually subside and the urine returns to a normal condition. This form of puerperal albuminuria is most frequently met with in primiparæ. Second, a class usually found in the multiparæ, where in the later stages of gestation, the urine becomes scanty and albuminous, accompanied by considerable anasarca. These usually go through labor safely, but the kidney lesion passes into a sub-acute productive nephritis, which becomes chronic. Third, a class characterized by a daily increased secretion of an albuminous urine, deficient in its percentage of urea. General symptoms are frequently absent, and confinement may be passed without accident; this condition frequently occurs in the multiparæ and usually subsides after confinement, or it may terminate in chronic nephritis. When the urine contains serum albumen, the case generally ends fatally or terminates in chronic nephritis. When the albumen is largely paraglobulin, eclampsia may be expected; in the more chronic cases, and when the condition is due to intra-abdominal pressure, the symptoms quickly subside, as soon as the pressure is removed by delivery of the fœtus.

In the last two forms the prominent symptoms may extend over a period of weeks or months. In the

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first the advent is sudden and often leads to the death of the fœtus in utero, as well as of the patient.

TREATMENT. — For symptomatic indications, see uræmia, acute and chronic nephritis, and Chapter XL. General treatment should be instituted as soon as the condition is discovered, especially if any symptoms of toxæmia or cerebral symptoms are present, *i. e.*, headache, vertigo, nausea, vomiting, loss of sight or hearing, and especially dyspnœa.

All modern authorities agree that in cases of pregnancy with albuminuria and symptoms of toxæmia, emptying of the uterus is of vital importance. This can be accomplished in three ways: If the case is not urgent, after the parts are made perfectly aseptic, the cervical canal should be dilated with a steel dilator, then packed with sterilized gauze, and the vagina tamponed; the tampon should be removed in from 24 to 36 hours. Previous to the sixth month, this may be repeated until the cervix is sufficiently softened to allow of curetting. Hemorrhage is sometimes severe, and, when profuse, a uterine tampon may be required. After the seventh month and the case is not too urgent, use a tampon for 24 hours and follow it with manual dilatation and delivery, with the usual after treatment. Other cases require manual dilatation within an hour to save the life of the mother, and still others, from deformity, may require Cæsarean section.

Edgar in the Medical Record, Dec. 26th, 1896, summarizes the accepted treatment of to-day as follows:

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"Prevention has three indications: to reduce the amount of nitrogenous food to a minimum; limit the production and absorption of toxic materials in the intestines and tissues of the body, and assist in their elimination by improving the action of (1) the bowels, (2) the kidneys, (3) the liver, (4) the skin, and (5) the lungs; if necessary, remove the source of fœtal metabolism and of peripheral irritation in the uterus by the emptying of that organ.

"The reduction of the amount of nitrogenous food to a minimum, can best be fulfilled in an exclusive milk diet, to which, as the symptoms subside, can be added fish and white meats. He has found it not only safer, but less trying to the patient, to commence with an absolute milk diet, than to compromise and afterward be compelled to cut off all but the milk.

"Elimination must be secured by an abundant supply of pure air and water, assisted by moderate exercise or light calisthenics or massage in certain instances. For the bowels he advocates daily doses of Colocynth and Aloes at bedtime, followed by a saline in the morning. For the liver an occasional dose of Calomel and Soda at bedtime, followed in the morning by one of the stronger sulphur waters, as Rubinat, Villacabras, or Birmenstorf. Increased diuresis is secured by maximum doses of Glonoin. The action of the skin is encouraged by encasing the body in wool or flannel underclothing, by massage, by the warm bath, hot bath, hot pack, or hot air bath, according to the urgency of the case.

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"In instances of eliminative insufficiency he gives at bedtime twice weekly, or more frequently if necessary, a tablet composed of Calomel, Digitalis, and Squills, each one grain, and Muriate of Pilocarpine, one-twentieth of a grain, followed in the morning by a full dose of Villacabras water.

"Finally, when exercise cannot be taken and an abundant supply of fresh air is wanting, oxygen inhalations will prove of service.

"Every case must be treated on its merits. In one a restricted diet and mild stimulation of the renal and intestinal functions is sufficient, and the patient may be allowed to be about and even exercise in the open air, the skin being protected from sudden changes by being incased in wool or flannel. More pronounced cases of eliminative insufficiency must be kept absolutely quiet in bed, upon an exclusive milk diet, with the stimulation of all the eliminative organs.

"The hygienic and medicinal treatment is only of secondary importance to the milk diet, which is the foundation of the preventive treatment of puerperal eclampsia. When, in spite of an exclusive milk diet and the vigorous stimulation of the five excretory outlets, the symptoms and signs of the pre-eclamptic condition continue or at any time become urgent, the indication is to induce artificially abortion or premature labor.

"Curative treatment also has three indications: to control the convulsions; eliminate the poison or poisons which we presume cause the convulsions; empty the

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uterus under deep anæsthesia, by some method that is rapid and that will cause as little injury to the patient as possible.

"The four medicinal means most certain and safe as anti-eclamptics are Chloroform, Morphine (hypodermatically), Veratrum viride, and Chloral hydrate, the latter alone or combined with Sodium bromide. His preference is for Chloroform, Veratrum viride, and Chloral, in the order named. Morphine he has abandoned almost entirely, as he believes it prolongs the post-eclamptic stupor and increases the tendency to death during coma by interfering with the eliminative processes.

"Second only to Chloroform in value is Veratrum viride. Provided the pulse be strong as well as rapid, it is the most certain means for temporarily and even permanently controlling the convulsions. When the pulse is weak he relies upon Morphine hypodermatically, Chloroform by inhalation, and Chloral by rectum, with stimulation if necessary.

"(1) Veratrum viride reduces the pulse rate, and convulsions are practically unknown with a pulse rate of 60 or under; (2) it reduces the temperature; (3) it relaxes and renders more yielding the rigidity of the cervical rings; (4) it causes prompt diaphoresis and (5) diuresis, so that it aids not only in the fulfilment of our first indication, the control of the convulsions, but in the second, the elimination of an unknown poison as well. Norwood's tincture should always be used;

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five drops hypodermatically, or 10 to 30 drops by mouth, as the pulse, etc., indicates.

"He secures catharsis as early and as promptly as possible by the administration of Croton oil, compound Jalap powder, or Calomel, followed by salines and high enemata of Magnesium sulphate. In the coma or post-eclamptic stupor of the condition, he relies upon the repeated administration of concentrated solutions of Magnesium sulphate or Villacabras water, by means of a long rectal tube high up in the descending colon. The hypodermatic administration of Magnesium sulphate is too slow and uncertain. Diuresis is obtained by dry or wet cups over the kidneys, followed by hot fomentations. Glonoin, as a diuretic and anti-eclamptic, cannot be overestimated. Diaphoresis is encouraged by means of the hot-air bath or the hot pack. Pilocarpine, as a diaphoretic, in the presence ot an eclamptic attack, is utterly rejected, because of the danger of œdema of the lungs and glottis which it may produce. The drawing off of large quantities of toxic liquids in the form of blood or serum, by means of venesection, catharsis, diaphoresis, diuresis, followed by the replacement of the same, by intravenous, stomachic, rectal or hypodermatic means, causing a washing or disintoxication of the blood and tissues as it were, has thus far proved of doubtful value. In instances of collapse, however, with the small compressible pulse, the introduction into the blood of a normal saline solution is of the same value here as in collapse under other

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circumstances. As a general stimulant, to assist in the elimination from the lungs and to prolong life in the post-eclamptic stupor or coma, he has found the free administration of Oxygen of the greatest value. Further, Alcohol will often be needed as a stimulant during and after an eclamptic attack, and Strychnine in the post-partum state and in the face of threatened collapse—although for physiological reasons it would seem to be contra-indicated."

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The portions of the kidney not affected by the tubercular inflammation are very apt to undergo an interstitial inflammation of the chronic type.

Sometimes the disease is self-limited, and the areas of cheesy degeneration are seen to have been infiltrated with the salts of lime.

Clinical History.— In primary tuberculosis of the kidney there is usually a certain amount of involvement of the general genito-urinary organs before its discovery. At first, when the parenchyma only is involved, there are no symptoms; pain, etc., developing simultaneously with the involvement of the mucous membrane, or when a tubercular abscess opens into the pelvis of the kidney. Sometimes at the first examinations the diseased kidney can be distinguished as a tumor on the affected side. There is soreness referred to the lumbar region, with an occasional lancinating or burning pain extending down the groin into the testes or labia, which increases during micturition; it may be increased by motion, and some, to lessen the pain, fix the parts and keep them quiet by acquiring an apparent lateral curvature of the spine. As the pelvis of the kidney and the uretral opening at the bladder becomes involved, micturition becomes more frequent and distressing. The urine at first may be increased in quantity, but in other respects appears apparently normal; when the bladder becomes to some degree involved, or a pyonephrosis develops, it may become alkaline, and contain tubercle bacilli, small cheesy masses, pus, albumen, and occasionally a little blood. Hæmaturia, however, is

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not a constant symptom, as it is in cancer of the kidney, though Pousson, Jour. de Méd. de Bordeaux, 1895, reports a case of primary renal tuberculosis in which there was profuse and long continued hemorrhage without other change in the character of the urine. The hæmaturia is not influenced by exercise. If the tubercles at any point in the kidney rupture and discharge their bacilli, their presence in the urine with pus, blood corpuscles, fibrinous shreds, etc., will establish the diagnosis. Renal casts are sometimes present, but they are unimportant. If the disease is confined to one kidney, the plugging of its ureter by a cheesy mass may at times cause the urine voided to appear clear and natural. In all obscure urinary diseases, especially when primary tuberculosis of the kidney is suspected, a cystoscopic examination of the bladder should be made and the ureters catheterized. The diagnostic indications by the cystocope are as follows: the bladder walls surrounding the uretral openings appear congested, and may have the appearance of foot-prints in snow. If the urine flowing from the uretral catheter contains tubercular bacilli, and the urine and ureter of the opposite side are normal, local tuberculosis may be positively diagnosticated.

Frequent micturition in childhood, with mucus in the urine, is frequently the forerunner of renal tuberculosis, and when accompanied by painful micturition, has been mistaken for stone in the bladder.

When the symptoms simulate stone in the bladder, the rise of temperature, which occurs in tuberculosis, will differentiate the two conditions.

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Frequent micturition, accompanied with urinary incontinence, without apparent cause, should always excite apprehension of a tubercular involvement of the kidney, especially if there is tubercular family history.

As the disease progresses, emaciation, hectic fever, loss of strength and general systemic involvement, with diarrhœa and vomiting, appear.

The disease is usually fatal, although in some cases life may be prolonged for years: a few have apparently recovered.

In secondary tubercular involvement of the kidney the symptoms are unimportant, though pain and soreness, referred to the lumbar region, with albuminous urine, would make us especially careful in regard to the prognosis. If tubercular bacilli are found in the urine, the case must be considered hopeless.

TREATMENT. — Arsenicum iodatum, Calcarea iodata, Kali iodatum, Hekla lava, Chininum arsenate, Chininum sulphate, Calcarea hypophosphorica, Calcarea carbonica, and Kreosotum must be prescribed as indicated by their general symptomatology; see indications in Chapter XL.; and Bacillinum, 30 or 200, a dose once a week, as advised for tubercular conditions in other parts of the body, should be tried.

Change of air and surroundings, with general hygiene or a sea-voyage, will be beneficial when the urinary symptoms will allow.

In the early stage of primary renal tuberculosis, much may be expected from a change of

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climate. A dry, equable climate should be selected. High altitudes with too cold an atmosphere are rarely beneficial; cold is particularly unsuited to these patients, since chilling of the surface greatly increases the kidney lesion: hot, dry climates have the disadvantage of causing concentrated urine, which distinctly increases the bladder irritability. A nephrotomy with proper drainage of the tubercular pus cavity is sometimes beneficial, and removal of the diseased kidney may be indicated when a cystoscopic examination of the bladder and catheterization of the ureters demonstrate the healthy condition of the other kidney. The immediate results of this operation are often brilliant, both as to relief of the suffering and mortality; in some cases a cure may be hoped for, but usually the diagnosis cannot be made sufficiently early for the operation to be of any permanent benefit.

The frequent and painful micturition in some of the more chronic cases may require for its relief a cystotomy for drainage.

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CHAPTER XVII.

Renal Syphilis.

Acute Syphilitic Nephritis.

Etiology.—It frequently develops early in the secondary stage of syphilis, *i. e.*, eight to twelve weeks after the original chancre. Albuminuria occurs in about four per cent. of all syphilitics.

Pathological Anatomy.—The uriniferous tubules are congested and the gross appearance of the kidney is very similar to that of the exudative nephritis occurring after scarlet fever.

Clinical History.—Micturition becomes frequent, the urine is reduced in quantity and contains albumen, blood, epithelial, hyaline and granular casts; œdema may be general or amount only to a slight puffiness under the eyes; headache and slight digestive disturbances are common.

Prognosis.—Resolution is rapid.

Treatment.—Mercurius corrosivus generally covers the totality of the symptoms; the general care is that advised for acute parenchymatous nephritis.

Chronic Syphilitic Nephritis.

Etiology.—In the later stages of syphilis interstitial hyperplasia, gummata and amyloid degeneration often develop without special symptoms except the presence of albumen and casts in the urine.

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PATHOLOGICAL ANATOMY.—The kidney may show amyloid degeneration, interstitial inflammation, or developing gummata; the three conditions are frequently associated, the amyloid condition predominating.

CLINICAL HISTORY.—The symptoms vary little, if any, from those of chronic nephritis. As the disease advances and the gummatous growths break down, the urine becomes turbid, of a dirty brown color, contains albumen, a large quantity of detritus, with blood and epithelial cylinders.

TREATMENT.—Good results will follow anti-syphilitic treatment, a milk or mixed diet, with good hours and hygiene.

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CHAPTER XVIII.

Renal Tumors.

Kidney enlargements may be congenital or acquired. The congenital comprising simple and dermoid cysts, hydronephrotic conditions, cavernous tumors, which give no recognized symptoms and are little understood, and sarcomatous growths.

The acquired are naturally divided into the extrarenal, pelvic, capsular, and glandular varieties. Extrarenal tumors include perinephritis, extrarenal cysts, which are sometimes only discovered at the autopsy having given no clinical evidence of their presence. Myxolipomatous tumors sometimes develop in the perirenal tissue, and attain considerable size. In malignant renal growths it is sometimes impossible to differentiate the intra- from those of extrarenal origin.

The pelvic variety includes hydro- and pyonephrosis, tubercular pyelitis, sarcoma and carcinoma. Villous tumors are rare, but when present they may develop to an enormous size. The glandular and capsular varieties include simple, hydatid and dermoid cysts, tubercular growths, and syphilitic gummata, which may be recognized by the specific history, and the relief produced by anti-syphilitic treatment. Lymphadenomatous growths are uncommon; they sometimes accompany Hodgkins' disease. Endotheliomata are also rare; the history of two cases, and their patho-

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logical specimens, were presented to the N. Y. Pathological Society, April 8th, 1896, by Dr. G. A. Tuttle. In one case there was pain, dragging in character, in the right groin, extending into the testicle; urination was scanty, with frequent night sweats. The tumor was the size of a cocoanut, occupied the right renal region, and was successfully removed. A number of small innocent growths sometimes develop, but as they present no clinical symptoms, they cannot be distinguished during life.

The symptoms of renal growths are not definite or constant — in fact, these are considered the most difficult of all abdominal tumors to differentiate. Renal tumors develop more frequently in childhood and after the fortieth year.

Malignant growths of the kidney.

They may be either carcinomatous or sarcomatous. In many respects they present similar symptoms, and may, therefore, be described together and their special points of difference noted.

Etiology.—No known, real or undoubted cause exists. The sarcoma is especially a disease of childhood, and usually develops before the eighth year. From this period until late in adult life malignant disease of the kidneys is rare, but when it does occur, it is generally cancerous, and of the medullary variety.

In nearly all there is a history of a fall, blow or strain, generally referred to the renal region.

Pathological Anatomy. — The following benign

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growths are occasionally found in the kidney: *Lipoma, Fibroma, Myoma, Angioma, Papilloma.*

They are, as a rule, small, and give no clinical evidence of their presence. They are seen at autopsies, when no lesion of the kidneys has been suspected.

Adenoma.—These tumors may be villous or alveolar in type. They vary in size, some being as small as a pea, and others of large size. Delafield and Prudden describe a papillary adenoma, which involves the whole of the organ, and is malignant.

Carcinoma.—This form of tumor is rare. It was once considered the most common form of malignant tumors of the kidney, but it is now generally admitted that many of the tumors which had been described as carcinomata were, in reality, sarcomata. It is often difficult to differentiate the two. When true carcinomata are found in the kidney they are generally metastatic.

McNeeney, in the British Medical Journal, February 8, 1896, describes two renal tumors, whose structure bears a semblance to suprarenal tissue. He is disposed to class them with the carcinomata.

Sarcoma.—Malignant growths of this class are by far the most common found, originating in the renal tissue. They may be of the round or spindle cell variety. There are also several mixed types described —*i. e.*, liposarcoma, myosarcoma, myxosarcoma; the last named are apt to originate in the pelvis of the kidney.

They may begin their growth outside the kidney,

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involving the organ by their peripheral growth, or their origin may be in the renal structure or in the pelvis.

Sarcomata are prone to grow to large size. They are soft and often break down, giving rise to hemorrhage of greater or less severity within their substance. Pressure of the tumor on the ureter may produce hydronephrosis. Thrombosis of the inferior vena cava may occur from the same cause.

They occur in the right kidney about as often as in the left, but rarely in both at the same time. They sometimes grow to an enormous size. Jacobi reported one weighing 36 pounds.

Clinical History. — From three-tenths to one per cent. of all malignant growths occurring in the human body originate in the kidney. When the disease is primary one kidney only is usually involved, while in the secondary form both are equally diseased. The growth may extend upwards, involving the spleen and lungs or liver and lungs, interfering with respiration, or downward into the illiac region of the side diseased and forward into the epigastric region. The size of the tumor can be approximately defined and distinguished by placing the fingers of one hand along the lower ribs behind and external to the larger muscles of the back, and the fingers of the other hand below the ribs in front, then on deep expiration, especially in a thin subject, the change in size of the kidney can be easily ascertained. It is usually immovably attached to the neighboring parts and on percussion

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there may be tympanitic resonance in front when it is covered by the colon.

Pain in the diseased kidney is quite a constant symptom, though frequently absent in sarcoma; it is usually spoken of as a continuous dull soreness, not especially affected by motion or position and does not shoot into the neighboring parts, down the groin, into the testicles or labia. The tumor is usually somewhat sore to touch.

The urine may at all times be normal, especially if the disease has developed external to the kidney, but as the parenchyma of the kidney becomes involved there will be blood in the urine, which may be slight and transitory or continuous and profuse, producing marked anæmia, etc., and gives the urine the color of porter, and frequently it contains small clots of blood. The hemorrhage is not affected by motion, position, or time of day, as occurs in the hæmaturia from calculi in the pelvis of the kidney. About one half of all cases of malignant disease of the kidney have a history of frequent or constant hæmaturia. The genital organs are rarely involved, while other organs rarely escape secondary involvement. As the disease advances the cancerous cachexia, emaciation, constipation or alternate constipation and diarrhœa, loss of appetite, etc., become more marked, and death finally ensues.

Death has been known to occur as early as the ninth week, while some have existed for a period of three to fifteen years, and others, after operation, have apparently recovered, to die ultimately. When

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the renal tumor is a carcinoma they survive from three to fifteen years; sarcomatous patients may live two or three years, and those with epithelioma between two and fifteen years.

TREATMENT. — Arsenicum album is frequently indicated and gives more relief than any known remedy. The hæmaturia may require Ferrum, Millefolium, Hamamelis Virginica, Secale, Ipecacuanha or Erigeron. The general building up of the system with nutritious and easily digested food must receive attention. If the cancerous condition is recognized early, when the disease is uni-lateral, the diseased kidney must be at once removed. The percentage of deaths from this operation is large, but many cases have apparently found relief and cure in a nephrectomy.

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CHAPTER XIX.

Hydronephrosis.

Hydronephrosis is an over-distension of the pelvis of the kidney with liquid, usually urine.

Etiology. — It may be congenital or acquired, permanent or temporary. The causes are numerous and are sometimes undiscoverable; the most frequent is obstruction to the natural exit of the urine. When this obstruction is above the bladder it produces hydronephrosis of one side only; when below, it will affect the pelves of both kidneys. Occlusion or absence of one or both ureters is the usual congenital cause. A calculus, blood clot, a mass of pus or any other foreign matter obstructing the ureter may permanently or temporarily close the ureter; sometimes a calculus acts as a ball valve. Tumors or growths of various kinds, either within, upon, or external to the ureter, will, by their impingement upon the calibre of the canal, cause this condition. It is also caused by retroflexion of the uterus, cicatricial tissue produced either from local inflammations, the result of surgical operations or injuries caused by the passage of calculi through the ureter, from twists and loops in the ureter, or from a movable or floating kidney. The abnormal origin of the ureter in the pelvis of the kidney, or when inserted into the bladder obliquely, may produce a valve-like opening, which, under certain

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conditions, would cause obstruction to the natural flow or exit of the urinary secretion, and produce hydronephrosis. The causes of double hydronephrosis are: polyuria, obstructions in the bladder, as large stones, tumors within, upon and external to the bladder, enlarged prostate, stricture of the urethra, and cancerous or other growths at any point on or adjacent to the genito-urinary tract.

Pathological Anatomy.— The ureters are dilated and their walls hypertrophied. They are sometimes sacculated and as large as small intestines.

The pelvis of the kidney on the affected side is dilated, sometimes emormously so, forming a large cystic tumor. The calices are each dilated, forming cysts.

The kidney tissue immediately surrounding the dilated portions is flattened. The rest of the kidney may undergo interstitial inflammation and pyelo-nephritis may be the result.

The dilated portions contain urine or, if suppuration has taken place, the urine may be mixed with pus.

Clinical History.— If congenital and bi-lateral it is rapidly fatal. The acquired form occurs more frequently in the male than the female. The subjective symptoms in many cases are wanting or are very obscure, and many patients live with this condition for twenty or thirty years without special inconvenience. Occasionally a hydronephrotic sac empties itself and spontaneous recovery occurs; but usually

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it slowly increases in size. A large hydronephrotic tumor is uncommon. There is some uneasiness and fullness referred to the affected loin and lumbar region, which may appear somewhat fuller and more distended than the opposite side. When large, the tumor may press on the lower part of the alimentary canal, causing constipation, or by its pressure upward upon the diaphragm and thoracic viscera, produce dyspnœa. It rarely causes death unless complicated by or associated with some other disease. When the abdominal walls are thin, the sac may be made out as an elongated, somewhat kidney-shaped, tumor. Usually it is not tender to the touch or to manipulation, but gives fluctuation on palpation and flatness on percussion unless it is covered by the colon or a coil of the small intestines, which may occur if the disease has developed in a kidney previously movable or floating.

Diagnosis. — Obstruction to the urinary duct has, in new-born infants, caused hydronephrosis and death. It is not necessary to have a complete obstruction to cause hydronephrosis. If the swelling in the loin and lumbar region disappears at times, followed by an unusual flow of urine, the diagnosis may be considered established; sometimes when the sac is very large a positive diagnosis is very difficult, as it might be mistaken for an ovarian tumor. (But ovarian growths increase in size from below upwards, while the sac produced by hydronephrosis increases from above downwards.) In hydatids of the liver or kidney aspiration and examination of the fluid will clear the

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diagnosis. The hydatid cyst contains the characteristic hooklets; the ovarian, the Graafian cells; and the cyst in the hydronephrosis contains urea, cholesterin crystals and urine. In cancerous growths the cachexia, loss of strength, emaciation and fever will materially assist in the diagnosis.

TREATMENT.—This varies greatly according to the size of the cyst and the concomitant symptoms. When there is no discomfort, the expectant plan of treatment, followed by gentle massage, has, in some cases, caused the sac to empty itself. If, however, the distress becomes persistent, or the tumor presses upon the neighboring organs, aspiration may become necessary. Sometimes successive aspirations results in a cure. On the right side the aspirating needle should be introduced midway between the last rib and illiac crest, and on the left, at the anterior extremity of the eleventh intercostal space. The utmost asceptic precautions must be observed in the operation, as infection has been known to transform the hydronephrosis into a pyonephrosis; therefore when frequent aspiration is indicated, it would be preferable to incise and properly drain the cyst.

When the hydronephrosis is the result of obstruction by a calculus, an operation through the lumbar region, for its removal, will be required; this in many cases has resulted in a urinary fistula, and, therefore, many prefer to make a nephrectomy.

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CHAPTER XX.

Pyonephrosis.

Pyonephrosis is a collection of pus, distending the pelvis of the kidney.

Etiology. — The causes are similar to those of hydronephrosis. In the course of a pyelitis, if the ureter becomes obstructed, pyonephrosis develops. A calculus, which at first irritates the pelvis of the kidney, may cause inflammation, and the discharge of pus finally obstructs the ureter, with consequent retention of pus and urine. Tuberculosis of the kidney and its pelvis is another cause, the discharged cheesy mass obstructing the ureter. Injuries of various kinds, and especially the pressure exerted during gestation, or from the uterus being pressed against the ureter or the pelvis of the kidney, may cause inflammation, formation of pus and obstruction. A hydronephrosis may be transformed into a pyonephrosis from careless aspiration for diagnosis or treatment, from rupture of an abscess in the kidney structure into an occluded pelvis, or the obstruction of the ureter by cheesy masses or blood clots. There are cases which are undoubtedly due to invasion of the ureter and pelvis of the kidney by an ascending gonorrhea, causing obstruction of the ureter and pyonephrosis.

Pathological Anatomy.—The mucous membrane of the pelvis is thickened. It is covered with fibrin

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and pus, and there is a necrosis of the superficial layers of epithelium.

If the condition has existed for a considerable length of time, it is apt to result in a suppurative nephritis, or a chronic interstitial nephritis.

Clinical History.—If pus is occasionally found in the urine, accompanied by a decrease in the fullness of the affected side, the diagnosis will be easy. The general objective symptoms are similar to those of hydronephrosis, but as the disease progresses, symptoms of sepsis appear. As this condition develops, the renal region becomes sore and sensitive to touch. The abscess may open into the peritoneum and cause shock and death. It may open into the surrounding organs. The duration of this disease is from three months to three years.

Treatment.—Attention must be given to the general building up of the system. In many cases drainage of the bladder has given great and permanent relief, but a nephrotomy or nephrectomy is only indicated when the disease is uni-lateral. If possible, the uretral obstruction must be removed. If it is of recent occurence, massage, with ingestion of large quantities of fluid, has in some cases been successful. If there is evidence of partial or complete obstruction to one ureter, and constitutional symptoms of pus absorption appear, surgical relief must at once be given as required by the individual case—*i. e.*, aspiration, nephrotomy, or nephrectomy.

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CHAPTER XXI.

Pyelitis.

Pyelitis is an inflammation of the pelvis and the calices of the kidney. The proximal end of the ureter is usually involved.

Etiology.— One or both pelves may be diseased, affecting one side when the cause is not lower down than the ureter or is local in character. When both are affected, it may be the result of constitutional disorders, diseases of the bladder or prostate, stricture of the urethra, etc.

It may be primary or secondary, acute or chronic.

Acute primary pyelitis occurs during the course of the infectious diseases, *i. e.*, typhus, typhoid, pyæmia, influenza, cholera, diphtheria, scurvy, scarlet fever, measles, etc. It may be caused by the chemical action of certain drugs, as Cantharides, Turpentine, Copaiva, Sandal wood, and some of the diuretics; by mechanical pressure as in hydronephrosis, or from infection by bacteria from the colon, or the result of exposure to damp and cold.

Chronic primary pyelitis is divided into the traumatic, calculous and tubercular.

Traumatic is of mechanical origin, occurring with or without uretral obstruction.

Tubercular pyelitis is dependent upon tubercular growths in the pelvis of the kidney.

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Calculous pyelitis is produced by the presence of a calculus in the pelvis of the kidney. If it can be dissolved or dislodged, the case can be cured, otherwise the symptoms of pyelitis will gradually become more distressing.

Acute secondary pyelitis is usually due to an ascending gonorrhea, or a simple cystitis.

Chronic secondary pyelitis is frequent. It may be caused by obstruction of the urinary flow by strictures of the urethra, an enlarged prostate, a chronic cystitis, pressure of tumors on, or a retained stone in the ureter, to irritating crystals in the urine from lithæmic or gouty conditions, or chronic catarrhal conditions resulting from altered metabolism, especially seen occurring in paraplegia and other forms of spinal disease.

Pathological Anatomy.

Acute primary pyelitis.—In the milder cases there may be a congestion of the mucous membrane of the pelves and calices, and a simple swelling of the surface epithelium. In the more severe cases the mucous membrane is coated with an exudate of fibrin and pus. The bacteria of suppuration may be present, and the suppurative inflammation may invade the kidney tissue, giving rise to a suppurative nephritis.

Chronic primary pyelitis.

The mucous membrane of the pelves and calices is thickened, the epithelium is swollen and necrotic. The inner surface of the pelvis is covered with pus, fibrin, and the dead epithelium.

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Acute secondary pyelitis.

The inflammation may be directly continuous with that of the lower urinary passages, or the ureter may be intact.

The mucous membrane may be simply congested, with a swelling of the epithelium, or there may be an exudation of serum, fibrin and pus, with swelling and death of the epithelium.

Chronic secondary pyelitis.

There is a thickening of the mucous membrane of pelves and calices. The epithelium is swollen and granular. There is a growth of granulation tissue beneath the epithelium.

When there are tubercular growths in the pelvis, there is in addition a more or less diffuse exudative inflammation. The exudate contains tubercle bacilli.

Clinical History.—In general there is pain referred to the lumbar region of one or both sides, with tenderness and soreness on deep pressure. The pain follows the course of the ureters, shoots into the perineum and thigh, and is accompanied by frequent and painful micturition. The urine usually contains pus, and may be acid or alkaline in reaction; tailed epithelium may be found, but their absence does not contra-indicate pyelitis. The general symptoms are such that the pyelitis is frequently overlooked in making a diagnosis. It is always important to differentiate between primary and secondary pyelitis.

Acute primary pyelitis.

It may be so slight as to escape notice, or, if diagnos-

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ticated, is of slight importance compared with the exciting cause. There may be chill, fever, intense pain in the region of the kidney, with scanty, purulent and albuminous urine, the condition being accompanied by involvement of the kidney tissue—(a true pyelonephrosis). This is a very severe form of the disease and is usually bi-lateral. Surgical treatment is of no avail. The remedies most frequently required and which are sometimes brilliantly successful are Aconite, Veratrum viride, Belladonna, Hepar sulphuris, Hekla lava, Sodium sulpho-carbolate, etc.

Chronic primary pyelitis develops slowly and insidiously, though it sometimes is the immediate result of a blow or fall upon the lumbar region. There is aching and uneasiness in the renal region, which at first may be transitory and accompanied by some tenderness and soreness on deep pressure.

The urine is acid in reaction with a specific gravity of about 1030, contains blood, pus-corpuscles, mucus, tailed epithelium, etc. As the disease advances the pus increases in quantity. The pus does not collect in masses, it is not ropy, but remains separated, giving a turbid appearance to the urine, and on standing settles to the bottom of the vessel. As the disease progresses the epithelial cells gradually disappear from the urine. The reaction of the urine is usually acid, differing from the alkaline urine of cystitis.

When the pelvis of the kidney is sacculated, the urine may become ammoniacal and very offensive,

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being fouled easily from the adjacent colon or by sepsis of the bladder, occasioned by surgical uncleanliness and the pus which, up to this time, has been mixed with the urine, rapidly separates from the acid urine, and becomes thick, solid, and stringy.

The microscope may reveal crystals of ammoniaco-magnesian phosphates, irregular and worm-eaten from contact with the acid urine. The most characteristic symptom of this disease, however, is an acid urine containing a variable quantity of pus, with a painful, tender and swollen kidney, which possibly gives evidence of fluctuation. Sometimes the breath and perspiration will exhale the peculiar odor of ammonia. In these cases beware of urethral instrumentation. The amount of albumen varies according to the quantity of pus and blood present in the urine. In pyelitis, when the ureter is free throughout its whole extent, pus will be constantly found in the urine, but if it becomes obstructed a tumor may be developed between the crest of the ilium and the last rib, giving a slight prominence to the affected side. When the obstruction is removed this tumor will disappear and large quantities of pus will be discharged with the urine.

In chronic pyelitis there will be fever, emaciation and weakness, often chill, fever and sweat (hectic), occurring at regular intervals, generally in the evening. This is especially true in conditions of pyonephrosis from occlusion of the ureter. When the pelvis of only one kidney is affected the kidney structure sometimes becomes absorbed from pressure or disease and

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results in the formation of an encysted collection of pus.

Traumatic pyelitis varies with the severity of the traumatism. If the injury has been slight it may be followed by a little hæmaturia and few or no symptoms, or again, pus may appear in the urine together with all the symptoms of pyelitis. The majority soon recover, others become chronic and removal of the diseased organ may be required.

Calculous pyelitis is caused by the presence in the pelvis of the kidney of one or more calculi. Women seem more prone to this disease then men. It may be present with pyuria for years without producing symptoms or change in the size of the kidney. Pain in the kidney region is usually present; it may be intermittent, moderate or excruciating. There are at times sharp twinging pains occasioned by the stone partly engaging itself in the opening of the ureter; or symptoms may be absent until long after pus has been found in the urine. As the case progresses the kidney increases somewhat in size, due to the swollen condition of the kidney and pelvis, or to retained fluid. Hæmaturia may accompany the pyuria. If an acute pyelitis is in any way added to the chronic condition it is usually severe.

Tubercular pyelitis is in fact a true pyonephrosis, or soon becomes one. It may remain sub-acute in character, causing little pain or fever; the urine is acid in reaction, laden with pus, albuminous, of low

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specific gravity, and tubercle bacilli appear in the urine.

Secondary pyelitis is undoubtedly the most frequent form of pyelitis and the least frequently recognized. It is due to an ascending inflammation along the ureter to the pelvis of the kidney from some disease or to obstruction in the bladder, prostate or urethra.

Acute secondary pyelitis is fortunately rare. It usually terminates fatally. It is caused by injudicious instrumentation of the genito-urinary tract in those suffering from prostatic disease or tubercular cystitis, especially in those past the 50th year in whom the lithæmic condition is well marked or by the sudden removal of the urinary pressure of a hydronephrosis.

A tubercular bladder is very intolerant of instrumentation, even in the early stage of the disease: the male bladder is less tolerant than the female. Washing of the bladder in this class of cases has caused acute ascending pyelitis, which announces itself sometimes within two hours after the instrumentation by a rise in temperature, etc. Therefore instrumental examination of an inflamed bladder with a nodular or tubercular prostate, must never be attempted without proper care and deliberation.

In lithæmia, the mucous membrane of the pelvis of the kidney and ureter is constantly eroded and irritated by the excess of urates which passes over it, and consequently they are not in a condition to stand sudden shock or inflammatory invasions. Instrumenta-

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tion, unless carefully made, with the most strict asepsis, may quickly light up a severe and fatal pyelitis. In the aged, urinary obstruction from an enlarged prostate causes first a dilated and sacculated bladder, and finally a hydronephrosis; slow continued pressure is made on the secreting tissues of the kidney, and the urine simply strains through. Digestive disturbances and weakness usually accompany the condition. In this class of cases, the sudden removal of the urine may result in acute congestion of the pelvis of the kidney and death in from five to ten days from acute pyelitis.

When acute secondary pyelitis is the result of an ascending gonorrhœa, the pyelitis is usually sub-acute in character and rarely fatal: in the tubercular variety it is usually uni-lateral.

Acute secondary pyelitis is characterized by a sudden rise in temperature, with a dull pain in the lumbar region, increased frequency of micturition, the urine being thick and cloudy and acid in reaction; in some cases it becomes rapidly suppressed.

Prognosis. — Acute secondary or ascending pyelitis usually results in death unless the offending organ is removed; many cases of the acute variety pass unrecognized.

Chronic secondary pyelitis has few clinical symptoms; it probably accompanies nearly all chronic diseases of the urinary tract, and its symptoms will depend upon the severity and duration of the vesico-urethral obstruction.

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Many recover without surgical interference, but it must be remembered that while a case of secondary pyelitis may remain apparently in a quiescent state for years, suddenly, without any apparent cause, an acute pyelitis develops, recognized by the chill, fever, thirst, vomiting, extreme pain in the lumbar region, etc., and is followed by death in a few hours or days.

TREATMENT. — In acute cases, Aconite, Veratrum viride, Belladonna, Rhus toxicodendron, Cantharides, Cannabis sativa, or Bryonia alba may be indicated; in the more chronic cases, where there is an excessive catarrh of the mucous membrane of the pelvis, Chimaphila umbellata, Berberis vulgaris, Pareira brava, Uva ursi, Benzoicum acidum, Sulphur, Pulsatilla, Buchu, Sepia, Hydrastinin sulphuricum and muriaticum, Stigmata maidis, etc., will be required, according to their special indications. See Chapters XXX. and XL.

In acute primary pyelitis, the remedies applicable to the general condition will be all that will be required. Ill-advised treatment or an unnecessary examination has not infrequently rekindled a latent tubercular or other inflammatory condition, producing an acute ascending pyelitis, suppression of the urine and death. Hence, in suspicious cases, the first examination with instruments should be made only after forty-eight hours' rest in bed, with general internal disinfection of the urinary tract by the administration of Boric acid, Oil of Eucalytus, Benzoate of Soda, Salol or Napthol, in physiological doses.

In acute pyelitis, the patient must remain in bed,

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and hot poultices or fomentations applied to the kidney region. Dry cups are sometimes required. Foot baths, hot air baths or general hot baths are recommended. Milk is the ideal diet. Stimulating and irritating food must be avoided. In acute primary tubercular pyelitis, a nephrectomy is always indicated, and it is sometimes necessary in the acute ascending variety. In the chronic forms due to obstruction, surgical relief will be required only when of tubercular or lithæmic origin. Drainage of the bladder by perineal section is frequently of great benefit. The treatment by distilled and alkaline mineral waters or Boric acid in doses of ten grains three times daily; Salol, five grains after each meal; or Saccharin, three times a day, must not be forgotten. When the disease is caused by calculi the administration of Hydrangea, Lycopodium, Silicea or Piperazine for the uric acid form, and Magnesium boro-citrate when from the phosphates and oxalates, has often caused the disappearance of the symptoms. If the calculi are not dissolved and the indicated remedy fails to give relief, a nephrotomy must be performed if the condition of the patient permits it; if an abscess has formed and points an operation should be made at once. First withdraw some of the pus with the aspirating needle, then open freely and dress antiseptically. In this operation there is no danger of perforating the peritoneum, as the kidney is outside and behind it.

Kelly, of John Hopkins' Hospital, reports the successful treatment and cure of pyelitis by douching the

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pelvis of the kidney after catheterization of the ureter, using the usual Boric acid, Nitrate of Silver or Bi-chloride solutions. After introducing the uretral catheter, he uses suction by means of a syringe to draw down the thick pus, small calculi, etc., from the pelvis of the kidney before using the pelvic douche.

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CHAPTER XXII.

Albuminuria.

Within recent years the subject of albuminuria has received special consideration: some observers have asserted that a physiological or natural albuminuria sometimes existed, dependent upon a perverted function of the sympathetic nerves, but the researches made by numerous profound investigators apparently demonstrate that albuminuria always indicates the presence of a pathological lesion, transitory or permanent, of some part of the genito-urinary tract.

Post-mortem examinations of the kidneys, where no clinical history has given evidence of renal disease, when carefully and minutely conducted, rarely fail to demonstrate gross or microscopic lesions. Hence, who can say that the so-called functional physiological or transitory albuminuria in a given case is not due to some of these insignificant pathological lesions which, under ordinary conditions, give no clinical evidence of their existence.

The albuminuria of renal origin has received proper consideration in the various chapters of this book, and the pathological lesions causing many so-called functional or physiological albuminuria demonstrated, together with some of those of extrarenal origin.

The extrarenal causes of the presence of albumen

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in the urine are legion, and must always receive careful consideration in formulating the prognosis of any given case. In lithæmic or oxaluric conditions the crystals of uric acid or oxalate of lime sometimes irritate and even scratch the mucous membrane of the uropoietic system, exciting an albuminous exudate—abrasions, congestions, inflammation of all grades, and ulceration of the mucous membrane of the genito-urinary tract, cause an albuminous exudate of more or less magnitude. In pyuria hæmaturia, hæmoglobinuria, etc., it can always be demonstrated. Another, and very frequently overlooked, cause of albumen in the urine in the male is the presence of the normal or pathological secretions from the prostate and seminal vesicles. When originating in this manner it is usually more noticeable in the morning urine; in the female the urine is often contaminated with albuminous secretions from the genital tract.

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CHAPTER XXIII.

Bacteriuria.

Bacteriuria is a condition in which the urine when voided contains large numbers of bacteria. This disease was first described by Roberts in 1881, and later was especially studied by Ultzman. It frequently passes unnoticed, or, if recognized, receives but little attention.

Etiology.—Bacteria may enter the bladder either from within, from the neighboring organs, or from without; in other words, infection or auto-infection. In the majority of cases of bacteriuria, auto-infection is the cause, either directly from the intestines, by contiguity or indirectly by absorption of the bacteria from the intestines and carried by the circulation and allowed to percolate through the kidney tissue with the urine. (The experiments of Baumgarten and others have proved beyond question that the kidneys have the power or physiological action to excrete micro-organisms.) Bacteriuria is believed to occur frequently when from any cause there is an abrasion of the mucous membrane of the rectum or intestines. In the direct manner, by contiguity of tissue, it may occur through the perforation of a prostatic abscess, either into both the rectum and urethra or into the rectum alone. In either way the bacteria reach the posterior urethra and then travel back to the bladder.

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In bacterial vesiculitis the bacilli coli commune sometimes pass into the bladder by direct communication, or they may contaminate the urine as it passes through the prostatic urethra. They may also travel back from the urethra, when originating there, into the bladder; a few find their way into the urinary stream from the lymphatics which have absorbed them in the intestines. Direct infection through the urethra may be carried by unclean instruments or where the canal previous to instrumentation has contained a bacterial nidus. Bacteria are sometimes inhaled and eliminated by the kidneys, as demonstrated by the urine of medical students when engaged in dissecting. This condition has also been frequently met with in chronic malaria.

Pathological Anatomy.—This disease is noted in uncomplicated cases for the continued healthy condition of the mucous membrane of the urinary tract, though patients suffering with bacteriuria are especially liable to cystitis if exposed to unfavorable influences.

Clinical History.—The symptomatic history is very meagre. The urine when voided is exceedingly offensive, opalescent and cloudy. This cloudiness is not changed by boiling, acidulation, or filtration with the ordinary filter paper; but if a Pasteur filter is used, the urine becomes clear; it may also be cleared by shaking it with calcined magnesia or carbonate of barium before filtration. The urine is always acid or neutral in reaction, never alkaline unless associated with some other condition. The bacteria

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and cocci are essentially those of intestinal fermentation. The bacilli coli commune predominate. The microscopic investigation can be made by adding a drop of aniline violet to a drop of urine on a glass slide; pass it slowly over an alcohol flame once or twice and allow it to cool, and then examine with an oil-immersion lens.

Bacteriuria is frequently associated with disease of the seminal vesicles and prostate. In my experience both sexes are about equally affected. It is very liable to recur, and is only cured by perseverance, careful therapy and hygiene.

TREATMENT.—The remedies most frequently indicated are Nitric, Muriatic or Benzoic acids; physiologically, Salol, Naphtalin, Salicylic acid, Oil of Wintergreen or Eucalyptus have been given with marked benefit. When the bacteria have been introduced from without, the various antiseptic douches used for the urethra and bladder will be required, and may be all sufficient; these are Potassium permanganate one to two thousand to one to ten thousand, Argentum nitricum one to four thousand to one to sixteen thousand, Hydrargyri bi-chloride one to ten thousand to one to twenty thousand, Carbolic acid one to five hundred, normal Quinine sulphate one grain to the ounce, or Borolyptol one part to four to eight of warm water. To remove all of the residual bacterial urine, the bladder should be catheterized every three hours for several days. In many cases good results are only procured when for some time the bladder is washed

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thrice daily after catheterization. When Bacteriuria is the result of lesions in the mucous membrane of the rectum or intestines, flushing of the rectum and colon with two quarts of soap and water night and morning has materially assisted in the cure of these cases, by removing and reducing the number of bacteria in the intestines. In all obscure cases the seminal vesicles must be interrogated and if diseased must receive proper treatment.

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CHAPTER XXIV.

Chyluria.

This name has been given to a condition of the urine when it presents a milky or opalescent appearance due to the presence of minute particles of fat in suspension.

Etiology.—It is caused by a parasite called the filaria sanguinis hominis, which is about one-seventieth of an inch in length, and the diameter of a red blood corpuscle, they are found in the blood stream. The larger worm, the filaria Bancrofti, is occasionally found in the lymphatics, and causes obstruction in the thoracic duct. There is also a non-parasitic form of the disease, caused by the obstruction of the thoracic duct in some other manner.

Clinical History.—This disease is endemic in the East and West Indies, Brazil, Cuba, China, Australia, and most tropical and sub-tropical climates. It is occasionally met with in the temperate zone, in those who have contracted it abroad, or have been poisoned by mosquitoes which were brought in ship cargoes from these infected regions. In the parasitic form the disease is due to the blocking of the lymphatics by minute micro-organisms, causing the contents of the lacteals and intestinal absorbents to escape through some accidental urinary or lymphatic communication. The filiaria sanguinis hominis are peculiar, in the fact that they can be found in the chyliferous urine at any time, but

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more particularly after eating. In the blood, however, they are found only during the night or sleeping hours. It is said that the blood of one in every ten Chinamen contains these micro-organisms, but they produce no symptoms unless the parasite becomes diseased, when the general health will suffer. There is progressive debility, lassitude, emaciation, etc., though the patients usually die from some intercurrent disease. The urine is characteristic, but at times all evidence of its chyliferous character will disappear for months or years; the urine is opalescent, and, at times, has a reddish cast, from the admixture of blood corpuscles. Its specific gravity varies from 1,007 to 1,020; from 80 to 100 ounces of urine are voided daily, the increase being probably due to the addition of the chyle and lymphatic products. The amount of fat varies from 2-10 to 2 per cent.; it increases after meals, exercise, and sometimes varies with the position of the body. When the urine is allowed to stand it behaves something like blood, thickening, and then separating into a semi-solid and a fluid portion; the micro-organisms are found in the coagulum; the urine has the odor of whey, and contains albumen, fibrin, and blood corpuscles.

Sometimes chyliferous urine coagulates in the pelvis of the kidney and the bladder, causing nephritic colic and cystitis; when this occurs, a catheter must be introduced into the bladder, and a solution of Sodium bicarbonate freely introduced to break up the mass, and facilitate its discharge.

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CHAPTER XXV.

Cystinuria.

This is a rare disease; its chief interest centers in the fact that it is the cause of the cystin calculi.

Etiology.—The latest researches point to a relationship between cystinuria and a micro-organism of intestinal origin.

Clinical History.—The urine may contain cystin intermittently for years without producing any special impairment of the health. The urine, when voided, has an odor resembling Orris root; it decomposes rapidly and, on standing, a greasy scum forms on its surface; the fresh urine has a yellow-green color and may be acid or neutral in reaction.

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CHAPTER XXVI.

Hæmaturia.

Blood, alone or combined with other foreign products, sometimes appears in the urine, and constitutes a condition described as hæmaturia. It may be derived from any part of the genito-urinary tract and may depend upon disease, follow an injury or the administration of certain drugs, *i. e.*, Quinine, Turpentine, etc. When the blood is from the kidney it is thoroughly mixed with the urine, the percentage of albumen is larger than would be expected, and contains blood corpuscles and sometimes casts: the clots are rounded and compressed to the size of the ureter. When the blood is from the bladder the clots are very large and irregular, and the relative percentage of blood in the urine increases as the bladder empties itself. When the blood is from the prostatic portion of the urethra the clots are leech-like or ovoid in form; and the percentage of blood is usually greatest at the commencement of the act of micturition; when the hemorrhage from the prostatic urethra is profuse it may, between the acts of urination, pass back into the bladder and become mixed with the urine. In other cases there will be only a drop of blood expelled at the end of the act. When the blood is from the urethra the clots assume the shape of this canal, and blood may ooze from the meatus between the

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acts of micturition. The exact location of the hemorrhage along the urinary tract must be differentiated by the urethroscope, cystoscope and the clinical history.

TREATMENT.—*Cantharides.* Hæmaturia of inflammatory origin with vesical tenesmus.

Crotalus horridus. Hæmaturia from blood degeneration, the urinary deposit looking like charred straw and contains degenerated blood cells and fibrin.

Equisetum hyemale. Hæmaturia and slight tenesmus, with tenderness and soreness over the region of the bladder, not relieved by urination.

Ipecacuanha. Hæmaturia, blood from the kidneys, accompanied by nausea, oppression of the chest, cutting pain in the abdomen and hard breathing.

Lachesis. Hæmaturia, the urine looks black, and is the result of blood degeneration.

Nux vomica. Hæmaturia with frequent and painful micturition.

Terebinth. Hæmaturia, urine smoky, turbid, with a sediment like coffee grounds.

Thlaspi bursa pastoris. Hæmaturia, blood bright or of dark color, urine also containing uric acid crystals and pus. The quantity of blood is increased by motion and is accompanied with pain in the kidney region.

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CHAPTER XXVII.

Oxaluria.

ETIOLOGY.—Whenever there is continuously an abundance of the oxalate of lime crystals in the urine, we have a condition which is designated as oxaluria, first described by Golding Bird in 1842. This name should, however, not be used unless the oxalate crystals are present in abundance, as they are normally found in the urine, and are slightly increased after the ingestion of certain foods. The urine is usually slightly clouded by mucus, and the crystals are, as a rule, only noticed on microscopical examination.

CLINICAL HISTORY.—There are two varieties of oxaluria. In the first class the urine is concentrated, dark in color, over-acid in reaction and of high specific gravity, due to the abundance of uric acid and urates; the patients are hypochondriacal, melancholy, sleepless and deficient in mental vigor; there is also digestive disturbances with imperfect assimilation of food, flatulence, loss of strength and great emaciation accompanied by neuralgic pains in various parts of the body. In the second class the urine has the same characteristics, the neuralgic pains are more marked, especially in the back and in the extremities, with great loss of strength, but without emaciation as in the former variety, and boils and small abscesses develop in various parts of the body.

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TREATMENT.—The remedies most frequently indicated are Nitro-muriatic acid, Senna, Oxalic acid and Berberis vulgaris.

The diet must be carefully regulated, composed of stale bread, food rich in phosphates, as fish roe, calves' and sheeps' brains, Hudson's food, etc. An absolute beef and hot water diet has been of the greatest advantage, and many have been cured by it alone. Sugar, tea and coffee should be interdicted, as well as vegetables and drugs containing an abundance of oxalates. Alcohol, as a rule, should be avoided; when stimulants are required, brandy, whiskey, red wine and bitter ale may be allowed. Hard water must never be drank, but soft or distilled water should be advised. A residence in the mountains or at the seaside, according to the individuality of the patient, should be recommended.

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CHAPTER XXVIII.

Phosphaturia.

This condition has been divided into three classes:

True phosphaturia is a persistent and abnormal increase in the earthy and alkaline phosphates of a sterile urine.

Functional phosphaturia is a transitory deposit of earthy phosphates, which sometimes occurs in the weakly. The urine may be acid or alkaline, the daily quantity of phosphates excreted in the urine being normal in amount.

Secondary phosphaturia is dependent upon a catarrhal affection of the urinary tract, the urea in the urine breaking up chemically and the resultant carbonate of ammonia combines with the magnesian phosphates in the urine to form the ammoniaco-magnesian phosphates.

True phosphaturia.

Etiology. — Phosphaturia is produced by some general condition which causes increased metamorphosis of the nerve matter, or by a change in the nutrition due to irritation of the nerve centres; it also precedes or accompanies debilitating types of disease, as tuberculosis, cancer, diabetes, etc.

Clinical History. — In this form the quantity of phosphoric acid daily eliminated by the kidneys is increased to some extent over the normal

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amount and varies with the cause and duration of the phosphaturia. The quantity of urine daily secreted is augmented, micturition is increased in frequency, accompanied by a little vesical irritability. The urine may be acid or alkaline in reaction; the patients are hypochondriacal, irritable and emotional. Vertigo is sometimes complained of, with numbness and weariness in the limbs and back. The gait is unsteady, the hands tremble, the tongue is pale and flabby, and constipation is usually present.

Functional phosphaturia.

ETIOLOGY. — Functional phosphaturia is caused by the ingestion of sugar, of over-acid fruits, champagne, etc.; it is also the result of over-indulgence in venery and perverted sexual habits.

CLINICAL HISTORY.—In this form there is no excess of phosphates, but the alkaline condition of the urine causes the normal and amorphous phosphates to deposit, producing a turbidity.

Beyond this turbidity of the urine there are but few symptoms, except a slight depression of spirits and the poor assimilation of food.

Secondary phosphaturia is the result of a deposit of the phosphates in the urine, due to their combination with the urate of ammonia, caused by inflammatory changes in the bladder or pelvis of the kidney. The phosphates may be discharged with the urine as white masses mixed with mucus, or they may be deposited on the inflamed mucous membrane.

TREATMENT.—Phosphoric acid in the potencies has

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given excellent results in both the functional and true phosphaturia. When of the secondary variety, the treatment will call for remedies indicated by the catarrhal condition which causes it.

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CHAPTER XXIX.

Pyuria.

Pus, derived from any part of the genito-urinary tract, is frequently found in the urine; this condition is called pyuria. Whenever pus is present, albumen will be found in a relative proportion.

When the pus is the result of kidney suppuration, the relative quantity of albumen will be large, casts are frequently present and the urine may be acid or alkaline in reaction. If it is acid, the deposit will be flocculent; if alkaline, it will be ropy. When the pus is from the pelvis of the kidney, the urine will usually be acid in reaction and contain a flocculent deposit; it may be alkaline and pus plugs and tailed epithelium will be discovered with the microcsope. When the pus is from the bladder, the urinary sediment will be thick and ropy, the reaction alkaline, and the urine will contain large numbers of triple phosphates, bacteria, bladder epithelia and swollen pus corpuscles and the last few drops of urine voided will be very turbid. When the pus is from the prostatic portion of the urethra, the urine will be acid in reaction, the pus sediment will be shreddy and frequently streaked with blood; the first portion of the urine passed will be cloudy and the latter portion may be clear and micturition is usually painful. When the pus is of urethral origin, it will usually be noticed oozing from

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the meatus between the acts of micturition and the last portion of the urine may be clear and free from pus, and always acid in reaction.

TREATMENT.—Varies with the cause.

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CHAPTER XXX.

Polyuria.

This is defined as a condition in which there is an abnormal secretion of urine of low specific gravity, free from sugar and albumen, and accompanied with great thirst.

Willis divides the excessive secretion of urine into two groups: hydrüria, in which the solid matters are deficient, and azoturia, in which there is an excess of urea. Fenwick believes that polyuria may be of both renal and extrarenal origin. He lays great stress on the fact of the persistent or transitory nature of the excess. His table gives the causes of polyuria and is as follows:

- **Persistent excess of urine.**
  - No sugar, but extreme thirst; urea increased. → Diabetes insipidus.
  - Albumen with casts, but without pus or residual urine. → Chronic Bright's disease, such as granular kidney, amyloid kidney and advanced scrofulous or syphilitic affections.
  - No albumen, but with residual urine. → Back renal pressure, from uretral twist or prostatic atony, or direct renal irritation of prostatic origin.
- **Transient excess of urine, usually diurnal.**
  - From sexual excesses or debility, without inflammation.
  - Dietetic idosyncrasy — *i. e.*, tea, beer, etc.
  - Hypochondriasis, hysteria, nervousness.

TREATMENT.—Nocturnal and diurnal polyuria, Scilla maritima; nocturnal polyuria, Phosphoric acid; diurnal

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polyuria, Ignatia amara, Murex purpurea. When from high arterial tension, Glonoine; from interstitial nephritis, Nitric acid. Diet and hygiene will depend upon the cause, etc.

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CHAPTER XXXI.

Renal Calculi.

ETIOLOGY. — Renal calculi may be caused by an excess of the solid matters of the urine, or by the deposit of certain inorganic salts, the products of inflammatory conditions. In the first class are placed uric acid, the urates, oxalate of lime, carbonate of lime, cystin, etc. In the second, ammoniaco-magnesian phosphates and phosphate of lime.

The urates, oxalates, phosphates, etc., are the result of over-concentration of the urine from dyspepsia, the ingestion of sweet wines, malted liquors, over-indulgence at the table with lack of exercise, an over-acid condition of the system, lithæmia, etc. In many, starch, sugar, or a diet of fatty food tend to the over-production of solid matter in the urine. The absence of salt in the food predisposes to this condition, *i. e.*, salt makes the uric acid more solvent; it also increases thirst, and insures a better daily flushing of the kidneys. Sexual disorders favor this condition, and age seems to have a special predilection. The statistics of Sir Henry Thompson show that in 1,827 operations performed by him for the removal of kidney stone 1,158 were on patients under 25 years; 1,001 under 15 years of age; from 25 to 35 there were 231 cases; and from 25 to 55, 303 cases, thus placing their greatest frequency of

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occurrence during the period of adolescence, undoubtedly engendered by the marked acid quality of the urine, as well as the frequent feverish conditions and low vitality so common at this period of life. Cadge has stated that the prevalence of renal stone in children is due to improper diet and an insufficient quantity of milk, and says that it will prevail in proportion as solid or artificial foods are administered. In youth we find the calculi largely composed of uric acid and urates; in middle life, of oxalate of lime; while in advanced life they are composed largely of ammoniaco-magnesian phosphates.

The condition of the drinking water of the neighborhood has a decided influence in the frequency of development of renal calculi. Hard water has a marked tendency to increase their occurrence and in neighborhoods where renal stone seems to be endemic, a change in the drinking water has resulted in a diminution of the number of stone cases. Atmospheric conditions and the quality of the soil and sub-soil, have no special influence on the production of the disease. As the female sex is less liable to exposure, etc., they are proportionately less liable to renal calculi.

Clinical History. — Renal calculi vary greatly, from a microscopic condition to those of considerable size. They may be round, smooth, rough or irregular, consisting of a primary pure specimen, as of uric acid, oxalate of lime, or composed of two or more primary elements, or a third variety, in which

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layers of all, or many, primary elements may contribute to its formation. Uric acid calculi are the most common. They may be yellow, brown or black, varying greatly in size, and present a rounded, smooth, or facetted surface. When fractured they have a crystalline appearance, and may appear laminated. The oxalate of lime variety are less frequent and are usually of a dark-brown color; their surfaces are hard and rough, but may be small and smooth; they are frequently associated with a uric-acid formation.

Cystin calculi are yellow in color, changing to green on exposure. They are translucent, and on section give some degree of radiation in structure. Xanthin calculi have the color of cinnamon. Indigo calculi are bluish-black; one was found by Ord, in the substance of a sarcomatous kidney. Phosphate of lime calculi are whitish, chalky, and vary in size. Carbonate of lime calculi are yellowish, gray or brown, hard and smooth. Sodium urates are soft and small. Urostealith consists of cholesterin, fat and uric acid; it is soft and greasy to the touch.

The formation of renal calculi is believed to be due to the presence of a colloid substance in the urine, which cements the molecular masses together. Reindfleisch says that the epithelial cells, with which the straight tubes are lined, generate a colloid material in their protoplasm. It is well known that in cases of renal calculi, in their early history, before

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other symptoms are present, that there is found a considerable increase of the mucus in the urine; it has also been noticed that the calculi are usually covered with a colloid substance or mucus, which is difficult to remove.

The symptoms of renal calculi vary greatly with their size, number, character and location; they may be situated beneath the capsule, imbedded in the cortex, in the parenchyma or calices of the pyramids, or found loose or encapsulated in some part of the pelvis of the kidney. They may give rise to the condition ordinarily spoken of as gravel; if expelled, they cause renal colic during their passage, and if retained in the kidney or its pelvis, they may produce calculous pyelitis and death. There may be absolutely no objective or subjective symptoms.

Pain in the kidney region is the most constant symptom. When the calculus is situated in the cortex there is a continuous severe fixed pain, or some uneasiness and soreness, aggravated by motion, and relieved by reclining or sleeping on the side of the diseased kidney, the pain being again felt when turning to the opposite side. A calculus, imbedded in the cortex of the kidney, may never cause pain or any change in the character of the urine voided. When the calculus is loose in the pelvic cavity it causes colic, with pain radiating to neighboring parts, which is often accompanied by severe bladder symptoms, the patient finding relief from the pain only by reclining and sleeping on the unaffected side. Within a year

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or so after the advent of the pelvic stone, pus, etc., will usually be present in the urine. When the calculus is situated in the parenchyma of the kidney, the symptoms will assume somewhat the character of the cortical or pelvic variety, according to location, etc.

The pain produced by a renal calculus may resemble that occurring in lumbago, and it may be present only when deep pressure is applied over the parts. Blood in the urine in variable quantities is a common symptom. It is generally produced by the irritation of the mucous membrane of the pelvis of the kidney by the calculus. In time a pyelitis is established and pus appears in the urine.

The quantity of blood is increased by motion, and especially by carriage-riding; the urine is acid in reaction, thus differing from the history when a calculus is present in the bladder, where carriage-riding does not increase the quantity of blood and the urine is alkaline in reaction. It must be remembered, however, that, in the chronic form of calculous pyelitis, the urine may be alkaline and may be accompanied by uræmia or hectic fever. Acute hydronephrosis may at any time develop from the obstruction of the ureter, by a calculus from the kidney. An increase in the amount of mucus and the density of the urine even when blood and pus are absent, are considered diagnostic evidence of the presence of a renal calculus. When an abundant shower of microscopic calculi are discharged, we have a condition called gravel, which pro-

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duces smarting and burning on micturition, with irritation and congestion of the urinary tract, pain and uneasiness, referred to the sacro-iliac region, which shoots down the course of the ureter, together with irritation at the neck of the bladder, headache, flatulence, malaise, etc. An over-acid and concentrated urine alone may keep up a long train of symptoms and finally causes or terminates in pyelitis, cystitis, etc.

TREATMENT.—When the urine is acid the remedy may be Nitro-muriatic acid, Nitric acid, Nux vomica, Pulsatilla, Sulphur, Benzoic acid, Lycopodium, Sepia, Magnesium boro-citrate, Quinia sulphate or Sarsaparilla, and when alkaline, Phosphoric acid, Phosphorus or Magnesia phosphorica. For symptomatology see Chapters XXXII. and XL.

Reduce the quantity of meat and increase the average amount of vegetables. Light meals must be the rule.

Prohibit the use of champagne, sweet and new wines, malted and spirituous liquors. Sedentary habits must be abandoned and out-door exercise gradually encouraged and continued. Frequent bathing and Turkish or Russian baths are beneficial. Massage once or twice weekly and frequent rubbing with a rough bath towel or flesh brush are productive of much good and more especially daily massage of the affected side. Sexual hygiene is important, especially in the young.

A pint of Piperazin water should be drank daily in divided doses; it is prepared as follows:

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℞ Piperazin, ... 3 ss.
Aqua Destil., ... ℥v.
M.

Sig. Tablespoonful to a pint of any mineral water.

Imported Vichy, Ems, Carlsbad, Bedford, Stafford, Contrexeville, Poland, etc., or distilled water in large quantities should be advised, and the alkaline flow of urine, which occurs usually about 10.30 A. M., if absent, should be re-established and maintained. When the alkaline waters do not produce the desired results, thirty grains of Citrate of Potash, well diluted with water, may be administered at bed time and between meals. If the calculus is large, alkaline waters tend to increase its size, therefore they are only indicated early in the case.

An alkaline condition of the urine prevents the deposit of the solid matters in the urinary tract, while acidity facilitates it. Whenever the urine for any length of time remains acid for the entire day it indicates over-acidity and concentration. These conditions may give rise to many, if not all, of the symptoms of gravel and neuralgia of the kidneys.

If continued and careful treatment does not remove all the symptoms, surgical relief will be required.

Before the exploratory examination or operation, the ureter should be catheterized, by the Caspar method in the male and Kelly's method in the female, and a proper examination of the urine made. In the female Kelly's wax-covered probes may be introduced

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into the ureter to ascertain if there is evidence of a calculus in the ureter or pelvis of the kidney. If a calculus is present, marked indentations will appear on the wax-covered end of the probe; the soft renal tissues make no indentation.

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CHAPTER XXXII.

Renal Colic.

This is caused by the passage of a renal calculus, a hydatid, or a clot of blood or pus through the ureter, the pain varying greatly in severity and duration, according to the condition of the ureter and the size and form of the foreign body.

Clinical History.—Renal colic may be moderate or severe, continuing only a few minutes, or it may be agonizing and last for hours or days; sometimes it is intermittent in character. It commences suddenly, although it may be preceded by some pain and uneasiness which is referred to the lumbar region of the affected side; it ends almost as suddenly when the foreign body enters the bladder.

When the foreign body engages at the opening of the ureter in the pelvis of the kidney it causes pain which is referred to the affected side. If, on the other hand, it becomes disengaged and passes back into the pelvis of the kidney the pain will cease for the time being, to return when it re-enters the ureter.

The pain usually commences suddenly, increases in violence, follows the course of the ureter and shoots down the inner side of the thigh, to the end of the penis and into the scrotum which is frequently retracted by the contraction of the cremaster muscle. The pain may radiate in various directions

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over the abdomen to the breast or up the back; it is paroxysmal, and so agonizing at times that it often, in nervous people, causes convulsions or syncope. As the attack increases in violence the patient rolls and twists from side to side and from one position to another in the endeavor to find relief. The face becomes pale, anxious, covered with perspiration, and the suffering is so great that they frequently scream and moan like a woman in labor. The pain continues between the paroxysms, but is less severe. There is an ineffectual desire to urinate, which is accompanied by burning, the urine being small in quantity and of dark color. Vomiting is of frequent occurrence. When the pain is very severe there may be rectal tenesmus together with frequent unsatisfactory stools. Unless the pain continues for some time there is usually no rise in temperature nor change in the pulse. If the foreign body becomes impacted in the ureter the intense pain may gradually subside and asume a gnawing character. This may disappear if the ureter enlarges to allow the urine to pass alongside the foreign body, but when it entirely occludes the ureter it leads to hydro- or pyonephrosis.

After passing into the bladder the calculus is usually expelled with the flow of urine during the next few hours; it may have caused great pain when passing through the ureter, but, if the urethra is normal, it may be voided with the urine without notice or pain. In order to ascertain the character of the foreign body which caused the colic, the urine must be carefully

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examined at each urination until the obstructing body is found.

PROGNOSIS is always good unless impaction occurs, causing a hydro- or pyonephrosis, etc. One attack predisposes to another. After the attack there is profuse micturition, and the urine may contain blood for some days.

TREATMENT.—*Argentum nitricum.* Nephralgia from the passage of renal calculi or congestion of the kidney; dull aching pain across the back, extending into the bladder; urine burns when voided; dark urine containing uric acid, blood and renal epithelium.

Berberis vulgaris. Renal colic; sharp stitching pains radiating from the renal region in all directions, particularly downward and forward into the pelvis; sharp darting pains along the ureters; urine has a reddish deposit composed of mucus, epithelium and lithiates.

Cantharides. Gravel in children, with irritating pain extending down into the penis, with constant pulling on that organ, also pain and congestion during the passage of renal calculi.

Coccus cacti. Renal colic and hæmaturia; lancinating pains extending from the renal region to the bladder; urine contains large quantities of brick-red sediment, urates, uric acid, etc.

Dioscorea villosa. Gravel, renal colic, pain shooting from kidney to bladder down into the testicles and leg, with cold clammy sweat over the body.

Lycopodium clavatum. Dull pain in renal region, relieved by micturition; renal colic, especially of the

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right side; urine scanty, high colored; red, sandy deposit composed of urates and uric acid; urine sometimes contains mucus and pus, causing a whitish sediment.

Nitric acid. Renal calculi and colic; the gravel is composed mostly of oxalate of lime.

Nux vomica. Renal colic or gravel; pain extending from the renal region into the genital organs or leg, usually associated with intense and continuous backache; painful, ineffectual desire to urinate; urine passed drop by drop, with burning, tearing pains at the neck of the bladder. Acts best on the right side.

Pareira brava. Renal colic, with pains shooting down the legs; violent pains into the glans penis so intense that patient goes down on hands and knees to urinate; urine contains a red sandy deposit with much thick white viscid mucus; urine ammoniacal.

Pichi. Renal colic, lithæmia.

Stigmata maidis. Renal colic, chronic pyelitis.

Tabacum. Renal colic with collapse from extreme pain.

Thlaspi bursa pastoris. Renal colic, renal calculi with hæmaturia; urine loaded with red crystals; has acted very satisfactorily in uric acid gravel.

Uva ursi. Renal calculi and pyelitis.

During the attack of colic, hot baths, sitz or general, hot fomentations or hot water bags placed over the seat of pain, give great relief and seemingly facilitate relaxation of the parts and passage of the calculus.

Alkaline waters in large quantities, Citrate of Potash

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in 20-grain doses well diluted, every three hours, and light beers have been recommended to increase the flow of urine and so force the obstructing body onward. Change of position and manipulation of the parts often give relief and dislodge the mass. The inhalation of Ether or Chloroform speedily alleviate. Suppositories of Opium and Belladonna are useful and act satisfactorily, but many physicians when called administer a hypodermic of Morphia (⅛ to ½ grain combined with $\frac{1}{120}$ of a grain of Atropia), the dose being regulated according to the intensity of the pain and repeated as required, but always, when possible, precede it by a large stimulating rectal enema which seems to favor the progress of the obstruction. The patient usually quiets down, becomes easy or falls asleep, to awake free from pain with, possibly, only a little soreness of the parts.

With some, however, the use of Morphia is followed by many unpleasant symptoms, especially so in the gouty, and it may be the direct cause of bringing on an attack of gout which may be more painful than the colic itself. In these and many other cases satisfactory results have been obtained by the administration of the indicated remedy; relief is not immediate, but they escape the attack of gout. The passage of a full-sized steel sound into the bladder has been recommended and used with satisfactory results; its action is probably reflex, causing the ureters to dilate and allow the urine behind to push the obstruction into the bladder.

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CHAPTER XXXIII.

Ureteritis.

ETIOLOGY. — Congestion of the ureteral tissue from traumatism, the presence of tumors, over-distention from any cause, or irritation by the urine, etc., predispose to true ureteritis, though it is almost invariably caused by infection, either ascending from the bladder by gonorrheal extension, descending as in tubercular lesions, hæmatogenous, or from contiguity of tissue in periureteral cellulitis, etc.

CLINICAL HISTORY.—A true pathognomonic history has not as yet been formulated, the symptoms varying with the exciting cause and the severity of the inflammation. The one symptom that has been recognized is tenderness and soreness of the ureteral canal on palpation. The inflammatory swelling may greatly encroach upon and reduce the calibre of the canal, and if the walls of the ureter are greatly involved, may terminate in a strictured condition.

TREATMENT. — The remedies are those indicated for the cystitis pyelitis, etc., causing it. See Chapter XL. The diseased ureter may be catheterized and douched with Nitrate of Silver, 1 to 2,000; or Permanganate of Potash, 1 to 5,000, etc., as indicated. Internal disinfection by physiological doses of Boric Acid, Salol, Oil of Eucalyptus, etc., has acted satisfactorily. When the disease is an accompaniment of

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suppuration, or any other condition of the kidney, requiring a nephrectomy relief of the symptoms sometimes occur only after the ureter as well as the kidney has been removed. This is especially true when it is of tubercular origin.

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CHAPTER XXXIV.

Ureteral Obstruction.

Stricture of the ureter may occur at any point of this canal The majority of cases reported have been located near the bladder; all narrowed conditions of the ureter are not, however, strictures. This canal, which is ten to fifteen inches in length, has three normal points of contraction; the first being 1½ to 2 inches from the pelvis of the kidney; the second at the junction of the pelvic and vesical portion, and the third at a point where the ureter crosses the iliac artery. There are also a number of thin-walled semi-lunar valves, situated transversely to the ureter, opening upwards, and one or many of them may become enlarged and obstruct the urinary flow, or retard the passage of a calculus. Strictures may occur at any point along the ureter, caused by cicatrization of a tubercular ulcer, from ulcerations caused by the passage of a calculus and possibly the result of an extension of a gonorrheal inflammation. The most frequent cause, however, of ureteral obstruction is the lodgment of a calculus in the canal, which may completely close the duct. When complete, it results in hydro- or pyonephrosis, which may finally cause atrophy of the kidney of the affected side. When the kidney and ureter of the opposite side are in a normal condition, it may

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occur without giving rise to any special symptoms. It may, however, be suspected, after a renal colic, with hæmaturia, etc., when the pain gradually becomes confined to one point, and the blood in the urine does not completely disappear, especially if pressure along the ureter gives rise to a pain at this special fixed point. The kidney of the opposite side soon undergoes hypertrophy, and unpleasant symptoms are rarely experienced; but if the ureter of the opposite side has been obstructed at some time in the past by a calculus, a stricture, or by the pressure of new growths, by displacements, or the kidney has been incapacitated, removed, or was undeveloped, the symptoms will then assume a very serious nature, namely, obstructive suppression of the urine. Sir William Roberts says: "When suppression is complete, the patient may live from nine to eleven days." Sir James Paget records a case of total suppression of twenty-one days' duration, with only one day on which urine was passed. The suppression may be partial or complete, varying with the size and contour of the calculus or tumor, etc. If complete, a hydronephrotic tumor develops on the side obstructed, giving a slight increased fulness to the renal region, uræmia sets in and death follows. In some of the cases reported there were no symptoms except suppression of the urine following the renal colic. In all cases of complete suppression time is valuable, and a diagnosis must be correctly made and surgical relief given at once, or the patient will soon die. The ureters should be examined with a

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Casper's ureter-cystoscope, or by the Kelly method. When possible, Kelly's wax probes should be used to verify the diagnosis, and the patient should also be examined for tumors, displacements, etc.

TREATMENT. — For symptomatic treatment see Chapter XL.

Hot fomentations should be applied to the painful parts; hot baths and massage are frequently of much benefit; intra-vesical injections of warm, antiseptic solutions have in some cases apparently overdistended the lower part of the ureter, and assisted the obstruction to pass into the bladder. When these methods fail, we must resort to surgical measures. First, make a lumbar exploratory incision and ascertain if a calculus blocks the opening of the ureter at its exit from the pelvis of the kidney. If this is negative, a nephrolithotomy may be indicated, when the ureter should be suitably explored with a steel, 4 to 12 F., bulbous bougie With this instrument it may be possible to dislodge the obstructing calculus, when it may pass down the ureter into the bladder; if not successful in dislodging the calculus, the surgical treatment will vary to suit the individual case. A renal fistula can be established, either through the lumbar region, into the vagina, or into one of the small intestines. If one ureter only is obstructed, and the other, with its kidney, is normal, the question of nephrectomy should be considered if such obstruction cannot be removed; if the calculus which causes the obstruction is situ-

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ated near the bladder opening, it may sometimes be discovered by a digital examination through the vaginal walls and surgically removed by that route. Again, the calculus may project into the bladder, being fixed in the ureteral exit, and may be disengaged by the Thompson stone searcher, or the end of a cystoscope. In ureteral operations, the canal must always be opened longitudinally to avoid subsequent stricture.

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CHAPTER XXXV.

Ureteral Injuries and Fistulæ.

The ureters are situated deep in the abdominal and pelvic cavities, and are so well protected by the bony and muscular walls behind and the abdominal viscera in front that injury can hardly be believed to occur without causing instant death. But cases are now and then reported of rupture of the ureter, the result of violence applied to the front of the body, by gunshot wounds or accidentally by the surgeon, also by injury to its internal mucous lining by the passage of a calculus; all of which may result in stricture and closure of the duct. Rupture of the ureter sometimes presents no immediate symptoms, in others they are masked by the general symptoms or conditions present. We may expect collapse, hemorrhage into the surrounding parts with extravasation of urine, which is usually non-irritant in character, accompanied by the passage of blood-stained urine, etc. Rupture of the ureter usually occurs at or near its junction with the pelvis of the kidney. When rupture of the ureter occurs a large quantity of urine, deficient in urea, soon accumulates in the cellular tissues behind the peritoneum, giving rise to a tumor on that side of the abdomen which may extend into the loin or to the iliac fossa. The fact that this effusion of urine into the cellular tissue does not cause

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suppurative changes is remarkable and deserves special notice. Harrison has advanced the theory that rupture of the ureter stops the secretive function of the kidney and the process of exudation alone is allowed to continue, hence, the deficiency of urea and consequently the absence of anything to cause ammoniacal decomposition.

In the ureter as in the urethra, traumatic conditions tend to stricture, leading to a closure of the duct, hydronephrosis, and finally atrophy of the kidney. When, however, the injury involves the peritoneum, shock, peritonitis and death are not long delayed.

Ureteral fistulæ sometimes occur, opening externally into the lumbar region, on the abdomen or in the groin, or they may communicate with the rectum, bladder, stomach, vagina or uterus. The fistula may be direct or irregular in its course. It may be caused by ulceration of tubercular or cancerous growths, and the presence of calculi or other foreign bodies, but it is more commonly the result of gynæcological operations.

In ureteral fistula there is a continuous or intermittent discharge of urine, which is usually normal in character. If the opening in the ureter is near the kidney the flow will be continuous; if near the lower extremity of the ureter, it will be intermittent.

TREATMENT.— This depends upon the conditions present. If the peritoneum is involved, a laparotomy and possibly a nephrectomy will be indicated. When there is fluid in the cellular tissue behind the peri-

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toneum, its repeated removal with the aspirator has acted satisfactorily, and recovery has been rapid; but if there is hemorrhage, a lumbar exploratory incision must immediately be made, the severed ends of the ureter looked for, properly united and the vessels ligated. All operations on the ureter above the iliac crossing should be retro-peritoneal, except when occurring during a laparotomy. The pelvic portion may be operated upon through the vault of the vagina, the rectum or perineum. Surgical operations are also indicated when, after injury to the ureter, it is believed that a stricture has formed, and Kelly's probe proves its existence. The latest operation for stricture, or rupture of the ureter is Van Hook's method of ureteral anastomosis; the ruptured or severed lower end is tied with silk or catgut, and a longitudinal incision made in the lower segment below the ligature, and into this is pressed the end of the upper segment which may be anchored in with a catgut suture. When the ureter is only partially divided, the wound should be extended longitudinally and the incised longitudinal wound sutured transversely, thus compensating for anticipated strictured conditions. The question of suturing the ureter into an intestine has been suggested but has many objections, especially that it allows the bacilli coli communes to travel back to the kidney, though many good results have been reported from this method. Borri, Polyclinico Number 19, 1895, reports many experiments on dogs; in two cases, he made a lengthwise in-

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cision in the intestine and connected the ureter with it by means of a button (similar to the Murphy's button), with a tube inserted into the ureter. The buttons came away in from nine to twelve days and the experiments were successful. Rydygien and Van Hook advise, in cases when the ureter is cut by the surgeon, that both ends of the ureter be brought out through the abdominal walls and the wound allowed to close about them. When union is complete they make an artificial channel of skin to connect the open ends, by making parallel incisions between the two openings and suturing the isolated integument to form a tube: after union has taken place along this canal, the ends of the ureter are sutured to it and the whole depressed by suturing the skin of the two opposite sides over it.

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CHAPTER XXXVI.

Renal Injuries.

Traumatism of the kidney is usually uni-lateral. It has the advantage over a diseased condition in the fact that the other kidney is supposed to be healthy and able to do the work of both. These injuries are brought about in two ways: either by puncture, gun-shot wounds, etc., or by external violence. Incised or gun-shot wounds are liable to involve other organs, and foreign bodies may be carried into the deeper tissues, producing other complications.

Injuries from external violence may occur without breaking the skin, as from blows, falls or the squeezing of the parts between heavy bodies. When the capsule of the kidney is not ruptured the hemorrhage is slight; when the kidney is ruptured it is usually in a transverse direction, rarely longitudinally. When occurring with other injuries, it may be overlooked.

Clinical History.—Collapse and shock are usually present, accompanied by pain referred to the renal region, local hemorrhage and hæmaturia. When injury occurs to the kidney and its appendages, nature often, during the collapse, causes plugging of the renal artery; the secretion of urea stops and only a watery fluid is exuded with the blood, and, consequently, destruction of tissue from its presence is rare.

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When the kidney is ruptured, sooner or later there occurs a swelling in that region, accompanied by a temperature of 103 to 105° F. In some cases the traumatism is so slight that pain in the renal region and a slight hæmaturia may constitute the entire clinical history.

TREATMENT.—The administration of Arnica, Aconite, Belladonna, or Veratrum viride as indicated, with rest, hot fomentation and stupes are in the lighter cases all sufficient. If there is an incised or gun-shot wound and evidence of peritoneal involvement, a laparotomy should be made, and the kidney removed if necessary. If the injury has not involved the peritoneal cavity, the lumbar opening should be increased in size to allow of careful examination, a catheter inserted for drainage, and the wound packed with iodoform gauze to arrest hemorrhage. When fracture of the kidney has occurred, if the peritoneum has not been involved, the kidney should be examined through a lumbar exploratory incision, and the parts unlikely to do well should be removed, the wound packed and proper drainage provided. In many cases, on account of the liability to infection, and on account of the possible formation of abscesses and a renal sinus, which are so unsatisfactory to treat, it is advisable to remove the kidney. If the pelvis of the kidney is ruptured, its edges must, if possible, be sutured. We must also remember, in this condition, that for some unknown reason anuria sometimes develops, even when the opposite kidney

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is healthy. The possibility of there being only one kidney should also be considered. If the injured kidney is dislocated and can be saved, it should always be stitched to the posterior abdominal wall.

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CHAPTER XXXVII.

Renal Fistulæ.

Etiology.—They may be caused by or follow traumatism and surgical injuries of the kidney, or result from the rupture of a pyonephrotic, pyelonephrotic or perinephrotic abscess.

Renal fistulæ of surgical origin are rare, except when the pelvis of the kidney is directly opened, unless necrotic or infected tissues have been involved in the operation. They are usually caused by the presence of a foreign body, such as a calculus or drainage tube, excessive and continued suppuration, incomplete drainage, and the continued escape of urine through the opening.

Clinical History.—They have received special names according to their point of opening.

Reno-cutaneous fistulæ are generally quite direct, and open usually in the lumbar or inguinal region. An erythematous patch of integument surrounds the opening, and from the ulcerated aperture a quantity of pus and urine will escape. The fistula is usually tortuous, and has thickened and indurated walls.

Reno-intestinal fistulæ usually open into the colon, and are characterized by vomiting and purging of pus and urine.

Reno-gastric fistulæ are very rare: three cases have been reported where renal calculi entered the stomach

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by a reno-gastric fistula and were expelled by the mouth.

Reno-bronchial fistulæ have also occurred.

TREATMENT.—Free, direct drainage, when possible, is always indicated. If the ureter is or can be made pervious; the usual surgical methods of packing the fistulous tract after curetting, will result in granulation and closure from the bottom, or the walls of the fistulous tract can be removed, and the wound closed with catgut sutures. If the ureter cannot be rendered pervious, and the opposite kidney is normal, a nephrectomy will be indicated.

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CHAPTER XXXVIII.

Suppurative Nephritis.

Etiology. — It may be the result of violence from without or originate within the kidney, from irritation of a calculus in the substance of the kidney, the breaking down of a tubercular mass, or by extension of inflammation from neighboring organs; surgical operations upon or in the region of the kidney or genito-urinary tract, exposure to wet and cold, infarction, embolism from malignant endocarditis or pyæmia, an ascending infection from the bladder, etc. Von Wunschheim says that, 1st, Pyelonephritis is the result, in the great majority of cases, of infection by the bacterium coli commune; in a fewer number of cases through the proteus, or the more ordinary forms of suppurative cocci. 2nd, a certain number of cases in which the ordinary pyogenic microbes are the cause of the irritation and consecutive pyæmia results. 3rd, pyelonephritis resulting from irritation of staphylococci and streptococci is not to be differentiated from other forms alone by the pyæmia present, but also, microcopically, by the marked necrosis of tissue and the absence of increased inflammatory tissue formation, which is produced by the bacterium coli commune. 4th, it is not probable that the typical ascending pyelonephritis can be produced by the passage of

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micro-organisms from the bladder through the circulation.

Pathological Anatomy.—Suppurative inflammation of the kidney may occur idiopathically or it may be due to various causes.

Idiopathic form. From some unknown cause the kidney may be the seat of one or more abscesses. The abscess may involve the whole of the kidney structure, it may be completely enclosed in a dense fibrous capsule, probably the thickened capsule of the kidney, or it may be connected with one or more sinuses which have burrowed into the surrounding soft parts. There may be an abscess of considerable size involving a part of the kidney, and a number of smaller ones, varying in size from that of a pin-head to a pea. As a rule, one kidney only is involved.

Traumatic form. Perforating wounds which have involved the kidney tissue or violent blows in the lumbar region may be followed by suppuration. The inflammation may be diffuse and the whole kidney converted into a purulent mass, or one or more circumscribed abscesses may be formed.

Suppurative pyelonephritis. This form of suppurative nephritis generally affects both kidneys. The mucous membrane of the pelvis is inflamed and covered with fibrin and pus. Throughout the kidney are seen numerous small abscesses, some of them so minute as to be seen only by the microscope. In addition to these, there is a diffuse suppurative inflammation. The tubes are filled with pus and blood. The stroma is

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infiltrated with pus cells. The mucous membrane of the ureters is often thickened and covered with fibrin and pus. Often the inflammatory process can be traced to the bladder, thus determining the source of infection.

Abscesses formed by infectious emboli. If there is a pre-existing malignant endocarditis or pyæmia, small infectious emboli may be deposited in the kidney structure with the formation of abscesses.

The whole kidney is enlarged and congested. The cut surface is studded with small reddish areas, each with a whitish centre. Microscopically these areas which surround the abscess are the seat of a diffuse inflammation, which results in swelling and death of the renal epithelium. Cocci may sometimes be found in the abscess cavities.

Clinical History. — One or both kidneys may be involved. It is, however, usually uni-lateral and distinct from other renal diseases. It may complicate Bright's and other forms of kidney conditions. There is some swelling or fullness of the loin on the affected side with tenderness on deep pressure, but the kidney is so deeply seated that it must not be expected that fluctuation will be found, nor is it well to wait for its appearance before giving surgical relief. The temperature, which is remittent in character, often reaches 103° F., and in many cases gives sufficient evidence of the presence of pus to warrant a nephrotomy long before the conclusive physical signs appear, and if pus is not found, no harm has been

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done. When pus is found, it may be clear and creamy or thin, ichorous and very offensive.

When the abscesses are small they may break down and discharge into the pelvis of the kidney, and blood and pus will appear in the urine; they may become encapsulated, others burrow into the neighboring parts and ultimately discharge externally or rupture into the peritoneum, pericardium, pleura, etc., and cause death by shock.

Symptoms are rarely perceived during life in infarction caused by emboli from endocarditis, and even when the endocarditis is of malignant or septic origin, they are masked by the general condition. When resulting from mechanical injuries or surgical interference, the violent and repeated chill, fever and sweat, vomiting and other digestive disturbances, as well as pain, swelling, etc., in the region of the injured or diseased kidney, are marked, and blood and pus may appear in the urine. Recovery may take place, but many pass into a typhoid state and die.

If of the ascending variety from cystitis following gonorrhœa, stone in the bladder, or following operation on the genito-urinary tract, there will be chills, irregular rise in temperature and profuse perspiration with rapidly developing typhoid conditions. The urine, which is diminished or suppressed, will contain blood and pus.

If of bacterial origin, it is almost always fatal. When the result of an enlarged prostate, or renal calculus, the patient is generally over fifty years

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of age. The onset of the disease may or may not be preceded by urinary symptoms. Chill and fever may be absent, but they are usually present to a moderate degree. The first symptom may be a decrease in the quantity of urine voided, with hæmaturia. Symptoms of septicæmia, sub-acute in character, soon set in, with anxiety, feeble pulse, etc., followed, in a short time, by death.

TREATMENT.—Veratrum viride, Arnica, Aconite or Belladonna in the beginning are often of decided benefit, and in many cases often abort the disease; later Hepar sulphur, Hekla lava, Silicea, Sulphocarbolate of soda, etc., will be necessary. Attention should be given to the diet, to build up the patient and repair the waste going on in the system. Liquid peptonoids, somatose, kumyss, matzoon, Hudson's food, malted milk, beef peptonoids, clam broth, etc., should, therefore, be recommended. Hot fomentations and general hot baths are very comforting and useful. When pus forms it must be evacuated, and removal of the diseased kidney may sometimes be necessary. Dr. Weir, Medical Record, Sept. 15, 1895, reports a case of surgical kidney of the right side, cured by removal of the diseased kidney, followed by treatment of the chronic urethral trouble, which was the exciting cause. When the condition of the patient warrants it, he advises an exploratory incision opening up the capsules of one or both kidneys, to relieve the tension of the renal capsule, and when one only is involved, its removal, if indicated.

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CHAPTER XXXIX.

Renal Surgery.

P. Wagner, in the Chir. Beitr., Festschrift für Bruno Schmidt, warns against the too hasty removal of the kidney, as experience has proven that the remaining kidney frequently does not undergo compensatory hypertrophy, consequently it does not do the work of both organs, and the patient dies from insufficient renal action: he advocates the following rules:

Nephrorrhaphy for floating kidney, including cases of intermittent hydronephrosis due to dislocation of the kidney.

Nephrolithotomy for renal calculi, whether in the kidney or its pelvis, in the absence of extensive suppuration or advanced alteration of the kidney substance.

Nephrotomy for pyonephrosis, hydronephrosis, and solitary cysts of the kidney or echinococcus cysts.

Partial resection for benign tumors, localized abscesses and calculus formation. This operation will probably have a much wider application in the future than it has at present.

Nephrectomy may be necessary either as a primary or secondary operation. As a primary operation it is indicated for malignant tumors of the kidney or its capsule, in tuberculosis, and in abscesses which are distributed throughout the whole kidney; also

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in injuries which have badly lacerated the kidney and caused uncontrollable hemorrhage.

Secondary nephrectomy may become necessary in emaciated patients with suspected tuberculosis in other organs, whom nephrotomy and tamponade have failed to relieve. In cases of abscess in which the integrity of the other kidney is suspected, nephrotomy is first to be tried; this failing, the kidney should be removed. For a similar reason, badly lacerated kidneys whose artery and vein are intact, should be sewed, tamponed, or in part resected, and nephrectomy be performed only secondarily if these measures do not succeed.

There remain to be considered only pyonephrosis and hydronephrosis. Primary nephrectomy in these cases deprives the body of the use of some remnants of active renal tissue, whose loss under certain circumstances may mean great danger to the patient. Ayer's investigations have shown that a hydronephrosis scarcely ever destroys all the secreting tissue. Nephrotomy in such cases can do no harm, and statistics show that the resulting fistulæ usually close. In cases where a fistula has long continued to discharge urine or pus, a secondary nephrectomy is to be considered.—*American Medico-Surgical Bulletin*, Sept. 12, 1896.

In the surgical treatment of the kidney, a nephrorrhaphy, nephrotomy, nephrolithotomy, pyelolithotomy or nephrectomy may be required. The first step in all extraperitoneal operations is a lumbar exploratory incision.

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After proper preparation and Ether has been administered, with the use of Oxygen if necessary, the patient is placed on the side opposite to the proposed operation and a sand or other pillow placed beneath the ilio-costal space of the sound side to increase the ilio-costal operating space. The limbs are slightly flexed upon themselves, and the body also somewhat flexed, the forearms brought in front of the chest and the head turned to one side.

The field of the operation is made aseptic and the exposed parts properly protected and covered with bi-chloride cloths. The incision is made directly over the posterior surface of the affected kidney; it may be vertical, transverse, or a combination of both. The vertical incision is made along the outer border of the erector spinæ muscle (about two inches from the spine), extending from the lower edge of the twelfth rib to the crest of the ilium. Sometimes to give more operative space it is necessary to continue the incision upwards and sever the lower rib. This should not be done if it can be avoided, as it sometimes results in pleurisy and other complications. If a transverse incision is preferred, it should be about three or four inches in length, about one inch below and parallel with the free border of the ribs. Many make a combination of both incisions, the transverse being about three inches in length so as to give the greatest amount of room for the removal of the kidney, if necessary. In these operations, the layers of integument, connective tissue,

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muscles, etc., are divided, layer after layer, and the bleeding points properly secured and ligated and the kidney examined by the finger. The operation is comparatively free from danger, although care must be taken not to destroy too much of the connective tissue which binds the kidney to the posterior wall of the abdomen. If no evidence of calculus or disease is found, the parts can be properly drained and packed with iodoform gauze or the cut edges of the muscular layers can be sutured with fine chromicized tendon or catgut and the skin closed with fine silk, without drainage, the dressing being completed with bi-chloride gauze held in place with long strips of adhesive plaster, then a layer of cotton and a snug binder. The wound will rarely require redressing for seven days. Recovery is usually rapid. Many surgeons believe that in the majority of cases, good results follow this operation, owing to a better fixation of the kidney to the abdominal wall, even when no evidence of disease is found by the exploratory incision.

Nephrorrhaphy.—This operation was introduced by Hahn in 1881. It is almost free from danger, the death rate being less than three per cent. The first step of the operation is a lumbar exploratory incision. The kidney is pressed into and held in place by an assistant, by pressure on the front of the abdomen. The wound is spread open with retractors, the fatty capsule opened and the true kidney capsule exposed. When this has been accomplished one of the following methods of fixation may be used: First, sutures are

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passed through the adipose capsule alone; second, through the fibrous capsule of the kidney; third, the sutures include a part of the parenchyma of the kidney, about one-half inch in width and one-sixth of an inch in thickness; fourth, the fibrous capsule is incised and partly stripped off, leaving a raw surface, and the sutures introduced through the capsule and parenchyma just inside of the border of the raw surface. From four to ten sutures are used to attach the kidney to the incised wound; catgut, silk, silk-worm gut or kangaroo tendon sutures may be used, according to the judgment of the operator. After the sutures are introduced and properly tied, the operation may be completed on the lines of the closed or open method, and the parts dressed antiseptically. In this operation it is necessary that a large amount of granulation tissue should be thrown off to glue and attach the kidney to its place, and this is best fulfilled when the capsule of the kidney is partly stripped off. Others advise the suturing of the kidney to the twelfth rib, and still others remove a portion of the lateral ligament of the spinal column and passing it through the kidney parenchyma, anchor the movable kidney to its place by a living tissue. The passing of the ligament or the sutures through the parenchyma of the kidney gives rise to no unpleasant symptoms, except possibly a transient hæmaturia. To make the operation successful, no matter which method is used, the patient should remain in bed for six or seven weeks, to allow the exudate to become thoroughly organized and hold the kidney firmly in its place.

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Pyelolithotomy.—It was formerly advised when the exploratory incision revealed the presence of a stone in the pelvis of the kidney, that an incision should be made into the side of the pelvis and the foreign body extracted; but experience has demonstrated that while pyelolithotomy was successful, a renal fistula usually resulted. They are very troublesome and are rarely, if ever, successfully obliterated. Kelly, in the Medical News, November 30th, 1895, reports a case of pyelolithotomy in which the pelvis of the kidney was opened on its posterior wall and a calculus removed. The pelvis was united by catgut sutures, the lumbar opening closed, and recovery was rapid and perfect.

Nephrolithotomy.—After the exploratory incision when a calculus is discovered in the substance of the kidney or its pelvis, either by touch, by the introduction of needles or a trocar into the substance of the kidney (the trocar being used when fluids are apparently present), a nephrolithotomy will be indicated. An assistant makes pressure on the front of the abdomen and pushes back the kidney to its normal position, so as to make it more readily recognized. In this operation the incision should be made longitudinally along the free convex border of the kidney, and of sufficient length and depth to allow of the introduction of the finger into the calices of the pelvis. If a calculus is found it may be removed by the finger or with a pair of forceps; after extracting the calculus the parts must be well flushed with a normal saline solution. The operation is completed by introducing a drainage tube

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nearly to the openings of the pelvis of the kidney, the incision in the parenchyma is drawn together with proper sutures, and the external wound closed by silk sutures, or the wound packed and dressed antiseptically. In operations upon the kidney, hemorrhage is usually slight and is easily controlled by packing with iodoform gauze.

Nephrotomy.—In abscess of the kidney or in pyelonephritis, the pus cavity is opened in the manner described above, and proper drainage secured. Many suture the cut edges of the kidney to the incision in the lumbar region, to facilitate drainage and prevent the pus from burrowing. In large abscesses of the kidney it is advisable first to make a nephrotomy for drainage, and later, when indicated, a nephrectomy. A nephrotomy is now considered advisable to relieve the tension when the kidney is overcharged with blood, as in acute productive nephritis, etc.

Nephrectomy.—This may be required in certain injuries to the kidney, or when degeneration or new growths render the kidney useless or a menace to the system in general; occasionally a persistent renal hæmophilia, the complication of a movable kidney, a calculous kidney, or a uretero-abdominal fistula may necessitate the operation. Before advising or making a nephrectomy the condition of the other kidney should always be interrogated. The surface of the kidney is recognized through the lumbar exploratory incision and is freed from its attachments by the index finger, care being taken not to open the peritoneal cavity or rupture

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any vessels, whether placed normally or abnormally. The kidney, when freed from its attachments with the exception of the ureter and its vessels, can be gradually and carefully lifted out of its bed and an aneurism needle with a stout silk ligature passed under the ureteral pedicle. The needle is cut out and the two ligatures separated about three-fourths of an inch, tied, the pedicle cut between them and the kidney removed. The ligatured ureteral end is cut close and allowed to drop back into the wound; a rubber drainage tube is introduced and the wound closed. If the hemorrhage is severe, the vessels may be secured by artery forceps, which may be allowed to remain for a little time, as they facilitate drainage. If the peritoneum is accidently opened, it must be carefully closed with catgut sutures.

Abdominal nephrectomy.—Is practised, but is not as acceptable or advisable as the lumbar operation; the true floating kidney may, however, require this operation.

The latest method of removal of the kidney by the abbominal route has been suggested and its usefulness demonstrated by Dr. Robert Abbe. Its advantages are as follows: It allows operation in the most advantageous position for the patient and operator. It gives about the best access to the kidney and ureter. It is the most bloodless method, as no muscles are cut. It allows of immediate suturing of the separated muscles, securing the strongest possible condition of the abdominal

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wall, precluding subsequent hernia. At a meeting of the N. Y. Surgical Society, February 24th, 1897, he presented a kidney removed by his abdominal route; the wound healed by primary union, and the patient was out of bed on the tenth day. The operation is as follows: An incision is made from a point one inch inside the anterior superior iliac spine and carried upward and backward four and a half inches, in a line parallel with the fibres of the external oblique muscle. The muscular fibres are parted with the index fingers, and an opening which admits of all necessary manipulation is readily made without dividing any muscular fibres. The peritoneum having been reached, the index finger is pressed backward to the perirenal fat, the peritoneal covering is readily removed from the front of the kidney. With good retractors the pedicle can be inspected and the ureter separated. In case the operation is for a hydro- or pyonephrosis, aspiration will empty the fluid and reduce the bulk of the tumor before removal. Through the anterior incision the finger can follow the ureter to the brim of the pelvis, where it can be tied off with a catgut ligature. After removal of the kidney, the abdominal wall falls together in the lines of muscular separation, and three catgut stitches are applied to each. A small rubber drainage tube may be inserted for one day if there has been extensive stripping of the tissues, but this is usually unnecessary.

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CHAPTER XL.

Symptomatology, etc., etc.

Acid aceticum. Urine light-colored, greatly increased in quantity; face and limbs have a waxy appearance. It is especially indicated when the lower part of the body and limbs are swollen: anasarca, with hot, dry skin, accompanied by gastric disturbances, sour belching, intense thirst, water-brash and diarrhœa.

Acid benzoicum. Urine smells like horse urine; urine changeable in odor, usually very offensive; high-colored, brownish or black; urine sometimes thick and bloody; specific gravity increased; urine hot, excoriating, and may contain mucus and pus; urea diminished in quantity; uric acid normal; urine cloudy, alkaline in reaction, containing phosphates and carbonates in large quantities; frequent desire to urinate, with tenesmus; patient pale and anæmic; congestion of the kidney, with increased quantity of urine; dropsy, with the strong, highly characteristic odor of the urine which is present immediately after it is passed. Frequently useful in pyelitis.

Acid carbolicum. Urine scanty, high-colored, greenish or almost black, containing albumen, granular and hyaline casts, epithelium and blood corpuscles. When administered to animals in toxic doses it has produced

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the characteristic urine of acute Bright's disease; increase in quantity of urine and frequency in micturition. Acute nephritis, with uræmia and coma; languor of mind and body, with headache and vertigo, and sometimes spinal pain; sensation as if a tight band was stretched around the forehead and temples; great fullness of the cerebral vessels; clonic convulsions; neuralgic pain, especially over right eye; frequent sighing and vomiting.

Acid gallicum. Is useful in three-grain doses three or four times daily for the albuminuria, which continues after the œdema and other acute symptoms of acute nephritis have disappeared. In this dose it reduces the quantity of albumen and increases the flow of urine.

Acid nitricum. Anuria; urine reddish, scanty, offensive, smelling like horse urine; ammoniacal, containing blood, pus and mucus; the urine on standing has a whitish sediment; urine is cold when passed; bloody urine; urging after urinating, with shuddering along the spine; albuminuria, with pressing pains in the region of the kidneys (5-drop doses of the first decimal dilution three times daily increases the secretion of the urine, diminishes the quantity of albumen voided, and reduces the dropsy); urine pale, specific gravity low, acid in reaction; frequently indicated in granular degeneration of the kidney, with gastric disturbances and general symptoms of atonic gout, etc., beneficial in amyloid or waxy nephritis, with the general symptons which accompany it, especially when

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of specific origin; great weakness sometimes noticed early in the morning is a very characteristic indication for this remedy in the more chronic urinary diseases; pain of a pressing character in the lumbar region; contractive pain from the kidney towards the bladder; it may be indicated in pyelitis.

Acid phosphoricum. Urine milky, mixed with jelly-like and bloody particles; pale and copious, containing excess of phosphates, alkaline in reaction; accompanied by pain in the back and general nutritive disturbances; on standing the urine becomes dark and turbid, and rapidly undergoes decomposition; albuminous urine; it is useful in amyloid and waxy nephritis, and is well indicated by the hectic and other evidences of suppuration elsewhere in the body that precede and accompany it; also useful in reducing the quantity of albumen secreted after the subsidence of an acute attack of nephritis. The mental condition of complete indifference is characteristic.

Acid picricum. Urine dark yellow, red, brown, with strong odor; specific gravity increased; urates abundant; indican abundant; granular casts; fatty degeneration of the renal epithelium; it is useful in intermittent hæmaturia, with degenerated blood corpuscles, the coloring matter being liberated and allowed to stain the urine; also for sub-acute and chronic nephritis, with anasarca and dark, bloody urine; soreness over the kidneys, worse on the right side; extreme weakness.

Aconite. Urine scanty, afterwards copious; albu-

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minous, sometimes bloody, containing casts; suppressed, dark, red and hot; acid in reaction. Congestion and inflammation of the entire urinary tract; congestion or acute nephritis from cold, with rapid development of general anasarca; high fever and restlessness, with pain referred to the region of the kidneys; sensitiveness of the kidney region; weariness and soreness in the lumbar region; it has been very beneficial in acute nephritis from cold, after the desquamation of scarlet fever accompanied by general dropsy; the child starts from sleep in agony, with cold sweat on the forehead and limbs; headache, pressing from within outwards; throbbing in the forehead and temples, aggravated by motion, noise and stooping; oppression in the cardiac region, with palpitation and great anxiety.

Adonis vernalis. Is a cardiac tonic increasing the contractile power of the heart muscles and causes contraction of the arterioles and possesses diuretic properties. The quantity of urine is rapidly increased under this action and cyanosis gradually disappears. Dyspnœa becomes less marked and respiration more regular. Botkin employed it as follows:

℞ Infus. adon. vernal . . . 4.0 ad. 200.0
Ol. menth. piper . . . . gtt ij.
Syr. aurant. cort 10.0
M.

Sig. Tablespoonful every two hours.

It is not cumulative in action though it may nauseate. Fifteen to twenty drops of the tincture may be administered as a dose.

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Ammonium carbonicum. Urine red, as if mixed with blood; turbid, high colored and fetid; alkaline in reaction; micturition frequent; it has been found very useful in uræmia, when indicated by somnolency or drowsiness, with rattling of large bubbles in the lungs; grasping at flocks; bluish or purplish hue of the lips; brownish color of the tongue; stupid, non-reactive state, etc.

Apis mellifica. Urine milky, high-colored, even black, or dark and frothy; fetid, bloody, containing albumen and casts; frequent discharge of small quantities of urine, which is burning and scalding, with pain in the small of the back; vesical tenesmus; general anasarca, most marked on the face and head; the dropsical conditions develop rapidly; the œdematous parts have a waxy, transparent hue, with a slightly yellowish cast; in this dropsical condition there is no thirst, the eyelids are markedly swollen, and the surface of the body feels sore and bruised. It is frequently useful in acute nephritis, following scarlet fever or pregnancy, and from other causes, with aching pains in the back, and soreness on pressure, or when stooping; suppression of urine, œdema of the lungs, and inability to lie down, with mental conditions dulled, etc.; twitching of the muscles; tonic and clonic spasms; general lassitude and trembling; faintness and prostration; rapid pulse; worse the latter part of the night, relieved when sitting erect.

Apocynum cannabinum. Urine copious, watery, light colored and passed almost involuntarily from relaxation

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of the sphincters; the prover says that he could hardly tell when the urine was passing, and scarcely knew when he was through, as it seemed to still want to dribble away; secondary effect, the urine, from inactivity of the kidneys, becomes scanty and high colored, with dropsy and bewilderment and heaviness of the head, drowsiness, disturbed, restless sleep, slow pulse, functions sluggish, bowels torpid; oppression in the epigastrium and chest, can hardly get breath, even to speak; a sinking feeling in the pit of the stomach and bruised feeling in the abdomen; aching in the small of the back and general anasarca; great thirst for water, which nauseates; fluttering feeling in the heart, with distress in the cardiac region; pulse irregular, intermittent, feeble, then slow. It has been used to relieve all dropsical conditions and acts kindly, especially in dropsy following scarlet fever; œdema of legs, feet and ankles. It is given in substantial doses of one to five drops of the tincture, or as "Hunt's decoction."

Argentum nitricum. Urine dark, containing blood and renal epithelium; urine scanty, concentrated, percentage of inorganic salts increased, with disappearance of uric acid; sudden urging to urinate, with dull aching in the small of the back and over the bladder; face rather dark in color and has a dried-up appearance; has been useful in congestion of the kidneys and in nephralgia; urine burns while passing and the urethra feels sore; drowsiness, stupor; convulsions preceded by great restlessness; vertigo, as if turning in a circle, accompanied by headache;

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head feels painfully full, relieved by being tied up; congestion of the head with throbbing carotids; gloomy; time passes slowly; worries because others consume so much time when their acts are in reality accomplished rapidly; impulsive, always in a hurry; nervous and easily excited, irritable and anxious.

Arnica montana. Urine bloody after injuries to the kidneys; urine brown, high-colored or black, of high specific gravity, becoming opalescent on boiling and clearing on the addition of Nitric acid; urine loaded with phosphates; bloody urine with red sediment, with cutting pains in the region of the kidney; hæmaturia; retention of urine from over-exertion.

Arsenicum album. Urine burning, high colored, dark, scanty or suppressed, containing albumen, with an abundance of waxy and fatty casts, fat globules, blood and renal epithelium; specific gravity diminished; urine mixed with pus, turbid, greenish, foul smelling, slimy; dark brown sediment; suppression of urine, with great anxiety, restlessness and sinking of the vital forces; uræmia (animals poisoned with Arsenic die comatose and post-mortem examination shows the kidneys to be congested and enlarged, the epithelial cells charged with fatty granules, and hypertrophy of the left ventricle was frequently found); urine voided with great difficulty; œdema more or less general, beginning with puffiness of the eyes and extremities and terminating in general anasarca; tingling in the fingers, especially of the left hand; dyspnœa, due to cardiac asthma; the heart may beat too strongly, being visible to the friends, or audible

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to the patients themselves; aggravated at night and by lying on the back; cardiac palpitation and irregular rhythm of the pulse; the heart may be weak and accelerated; the dyspnœa may be due to œdema of the lungs, and is noticed more when attempting to lie down, in the evening, and especially recurs at 12 P. M., and is relieved by expectoration; the dropsical parts have a pale waxen look, and blisters appear on the limbs and burst, allowing serum to ooze from them; the skin feels cool, while the patient complains of thirst for small quantities of water and require it frequently, but even this may irritate the stomach and cause vomiting. This drug acts well in the nephritis of scarlet fever and the chronic nephritis of malarial origin, with hypertrophy of the left ventricle of the heart and especially in the large fatty kidney; great anxiety is always present with a feeling that it is useless to take medicine as they are sure they are about to die; great anguish; rapid sinking of strength and great emaciation; relieved by warmth; wants to be wrapped up warm.

Aurum muriaticum. Urine clear, copious, albuminous, containing a few casts; urine increased in quantity at first from hyperæmia of the kidneys, finally becoming turbid, resembling buttermilk; scanty and albuminous, with frequent micturition; worse at night; pressing pains or feeling of heat around the waist extending to the bladder or down the sides, accompanied by despondency; suicidal tendency. It has been used successfully in the dropsy of pregnancy and

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chronic Bright's from syphilis; it rarely does any good unless the condition is secondary to cardiac or hepatic disease, with nervous symptoms hypochondriasis, oversensitiveness to pain, irritability, and vertigo. In interstitial nephritis it diminishes the quantity of albumen.

Belladonna. Urine scanty, deep red, turbid like yeast, albuminous, with reddish or thick white sediment, micturition difficult, voided by drops; congestion or acute inflammation of the kidneys with flushed face and feverish condition, possibly delirium, with tendency to strike and bite. The least jar of the patient increases the pain, etc. It relieves the congestion of the malpighian capillaries, but does not have any effect upon the secreting epithelium of the convoluted tubes; large doses aggravate, while smaller doses rapidly relieve the renal hyperæmia.

Berberis vulgaris. Urine yellow, red with a reddish and bran-like sediment, frothy; blood-red urine; greenish urine, or pale yellow with slight, transparent, gelatinous sediment which does not deposit; or a turbid, flocculent, clay-colored, copious mucous sediment, mixed with white or whitish-gray, and later a reddish, mealy sediment; sticking, digging, tearing pains in the region of the kidneys, worse from pressure; tearing pains extending from the back down the ureters into the pelvis; in fact, in all directions to the pelvis, hips and loins, labia and testicles, etc.; tensive, pressing pains across the small of the back; back feels stiff and numb; a bubbling feeling as if water was coming up through the skin.

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Violent stitching, tearing, burning pain in the region of the kidneys, extending forward along the course of the ureters into the bladder, to the posterior part of the pelvis and thighs; worse when stooping, lying or sitting, relieved by standing; stitches from the kidney to the bladder with frequent desire to urinate; drawing, tensive, tearing pains in the lumbar region; violent stitches in the bladder with frequent micturition; cutting, constrictive pain in bladder, whether full or empty; desire to urinate, with burning in urethra; burning in the urethra after micturition; motion aggravates the urinary troubles; pain in the loins and hips generally accompanying the symptoms; vesical irritability; burning, cutting and sticking pain in the urethra; frequent micturition, with burning before and during the act, especially in the female. This remedy has been of marked benefit in renal colic, gravel, and pyelitis, with great general prostration, and the face often gives evidence of deep distress or disease.

Caffeine. Is a diuretic and heart tonic; acts well in chronic croupous nephritis, with dilated heart and mitral or aortic disease; with general anasarca and ascites, 3 grain doses, three times a day; it acts more prompt than Digitalis, and is not cumulative in action; five grains has been known to cause cardiac distress, though 8 to 30 grains are frequently given daily.

Calcarea carbonica. Offensive, dark urine, containing thick mucus and depositing a white sediment

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like flour; involuntary discharge of urine when walking; frequent micturition at night; nocturnal enuresis, urine clear and sour-smelling. Prof. Lillienthal considered this remedy in the 30th potency the most frequently indicated and the most useful remedy in renal colic. It is especially indicated in stout, flabby and light-complexioned patients and in ailments arising from living in damp houses or places.

Camphor. Urine scanty, red or dark yellow, sometimes green; strangury; renal congestion has sometimes been relieved by this remedy; coldness of the body, yet the patient throws off the clothing, and will not remain covered.

Cannabis Indica. Urine copious, clear and light colored or colorless; at times scanty, dark and red, with burning and biting on micturition; it has given good results in uræmia with severe headache and sensation as if the vertex was opening and closing; forgetful; forget what they intended to say; conflicting thoughts, associated with delusion of time and space; they tell you they have had nothing to eat in months when the empty dishes are before them; objects a few feet distant seem a long distance off; all sensations and emotions (be they pleasant or painful) are exaggerated. These mental indications frequently lead us to the use of this remedy in chronic nephritis, with very gratifying results.

Cannabis sativa. Urine scanty, red and turbid, with drawing pains in the region of the kidneys extending to inguinal region, with anxious sensation at the

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epigastrium; useful in Bright's disease accompanying or the sequela of urethritis or cystitis.

Cantharides. The specific gravity of the urine is always high, it is acid in reaction, and contains large quantities of urates; urine red, dark, scalding and scanty; contains blood and pus corpuscles, epithelium and casts from the tubuli uriniferi; hæmaturia, urine red, as if mixed with blood, turbid, albuminous; micturition frequent and exceedingly painful, especially after the act. It acts on the secreting parts or tubes of the kidney tissue, and is useful in suppression of the urine in nephritis following scarlet fever, and other acute forms from cold, exposure, etc.; uræmic symptoms, stupor and mental torpor, with high fever, hard, frequent pulse, pain in lumbar region, and drawing, tearing pains in the region of the kidney, which is sensitive to the slighest touch, with tenesmus of the bladder; pains in the kidneys, loins and abdomen, with constant desire to urinate; burning, stinging and tearing in the region of the kidneys; violent pressing pain in the lumbar region, extending to the bladder; the cystitis calling for Cantharis is of a high inflammatory grade with hæmaturia; it may be accompanied by a chill, fever, etc.; in the gravel of children the pains extend down the penis, and there is a constant inclination to pull at the organ; thirst, but drinking always increases the pains in the bladder. The drug is useful also as a diuretic in chronic Bright's disease, relieving the cephalalgia, mental symptoms, coma,

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etc.; it may be useful for the convulsions and frequently prevents their appearance.

Carbo vegetabilis. Urine has a strong odor, is dark-colored, as if mixed with blood, and deposits a sediment.

Causticum. Urine light colored, with flocculent sediment; lithiates; urine loaded with urates from disease or exhaustion, without other marked symptoms; azoturia, with depression of spirits, debility, sour perspiration and excessive tissue waste.

Chelidonium majus. Urine dark yellow, turbid when passed; dark red or brown like beer, tinged with bile, and containing an excess of phosphates and uric acid, tube casts and epithelial cells, with diminution of the chlorides; œdema of the extremities. Croupous nephritis has been cured with this remedy; it is especially useful in the nephritis accompanying pneumonia in children. Pain in right kidney and liver; pains from the kidneys towards the bladder, followed by evacuation of turbid urine; drawing, tearing pains in the back, as if broken, aggravated by motion.

Chininum sulphuricum. Gravel; urine is scanty, acid, turbid, of strong odor, and flows slowly, with a sediment of yellowish-red crystals, or clear, containing four-sided prisms, the pointed ends being enveloped in mucus; urine turbid, alkaline, chocolate-colored, with increase of phosphates; sediments yellowish-white, mealy, like brick-dust, or in slimy flakes, with large numbers of transparent, colorless

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and orange-colored crystals; star-like, rhomboidal and flat crystals, mostly phosphates; cramping and neuralgic pains in the region of the kidneys.

Chloralum hydratum. Has been used extensively in uræmic convulsions in ten to thirty grain doses in rectal suppositories or injections.

Cina. Urine turbid and increased in quantity, urea augmented; urine has an orange or bloody tint; hæmaturia in children; bruised feeling in small of the back, not increased by motion; a feeling of constriction around the loins.

Coccus cacti. Renal colic; chronic cystitis; drawing, lancinating pain in the lumbar region, extending along the course of the ureters; cutting pain and heaviness in the bladder with constant urging to urinate, relieved by micturition; frequent ineffectual attempts to urinate at night, has to wait a long time before he can succeed; retention of urine until there is intense pain, when a small amount is passed slowly, with much suffering; pain and soreness in the region of the bladder; hæmaturia.

Colchicum. Urine dark, turbid or bloody, black as ink, albuminous, scanty or dark brown, with frequent urging to urinate; dropsy in gouty patients, with nervous weakness and hypersensitiveness; oversensitiveness to touch; senses too acute, affected by strong odors; gastric symptoms prominent; mental labor fatigues; inability to fix thoughts or think connectedly; headache; sleepiness during the day, wakeful at night; awakes with frightful dreams; the scalp feels

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tense; tongue coated, nausea, great muscular weakness, copious salivation and increased urinary secretion; nephritis, with severe drawing, stitching, tensive pain in the region of the kidneys, aggravated by stretching out the legs, by pressure over the kidneys, relieved by lying on the back and drawing up the legs; pain in the back and sacrum; constant chilliness, with cold extremities; coldness in the stomach; dropsy, with suppression of urine, especially in Bright's disease, with hydrothorax. Ruddock especially recommends this remedy in cirrhosis of the kidney, due to lead poisoning and in the gouty, with developing amaurosis.

Convallaria majalis. Urine scanty and albuminous; frequent micturition, the urine is burning and hot; lame feeling in the back, aggravated by lying down; it has been useful in the dropsies of chronic croupous and interstitial nephritis, and in the nephritis following scarlet fever; cardiac hypertrophy and valvular lesions; cardiac irregularity.

Copaiva. Urine bloody and albuminous, with strangury; urine copious, burning and scalding when passed; large doses cause renal congestion, and consequently scanty urine. It has cured desquamative nephritis with ascites and general anasarca, as well as the nephritis following scarlet fever.

Cuprum aceticum. Urine dark red; complete suppression; albuminuria; uræmic vomiting, stupor, convulsions, with blueness of the face and lips, eyeballs rotated inwards, frothing at the mouth, with violent convulsions; extensor muscles most prominently af-

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fected; convulsions, followed by deep sleep; dyspnœa, delirium, awakening with fright; uræmia, resulting from fatty degeneration of the kidneys. Convulsions begin in the fingers and toes and spread over the body; great restlessness between the attacks; decided metallic taste in the mouth.

Digitalis purpurea. Urine dark red, blackish, turbid, scanty, albuminous and of high specific gravity; it may be suppressed or copious with constant urging to urinate and inability to retain it (the urine, however, is more easily retained in the recumbent position); specific gravity diminished; it is useful when the dropsy is due to or associated with cardiac weakness; it is indicated in anasarca, with bluish cast of the œdematous portion of the body; a very frequent symptom is infiltration of the scrotum and penis; suffocative spells with sensation of contraction of the chest, as if it was grown together; passive hyperæmia of the kidneys; pulse feeble and slow, greatly accelerated on standing (hydropericardium); dropsy, with scanty, turbid, albuminous urine; sinking and faint feeling at the pit of the stomach; in large doses it is a diuretic, but the increased secretion of urine favors the retention of urea; in acute nephritis it is used as a diuretic, but it acts best in passive renal congestion due to enfeebled muscular power of the left ventricle and deficient action of the tricuspid valve, with scanty urine, œdema of the lungs and dropsy; Digitalis is not a renal irritant; it is frequently prescribed as follows:

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℞ Tinct. digitalis . . . . . ℥ ℈ss.
Acetum scillæ . . . . . ℥ ℈i ℈ss.
Spiritus etheris nitric. . . . . ℥ ℈ii.
M.

Sig. Teaspoonful every three or four hours.

Or digitaline one-fourth to one-half a milligramme in divided doses in twenty-four hours, or four drops of the tincture from the fresh plant every three or four hours; sometimes teaspoonful to tablespoonful doses of the infusion made from the English leaves, repeated every four hours, quickly reduce dropsical accumulations, by increasing the systolic contraction of the heart.

Dulcamara. Urine scanty, bloody, albuminous; nephritis resulting from cold and wet; acute croupous nephritis, with drawing pains in the small of the back, and chronic nephritis from the same cause with copious discharge of urine; turbid and offensive; great lassitude; a feeling of fatigue compelling one to sit or lie down.

Equisetum hyemale. Urine scanty, high-colored, albuminous, bloody.

Euonymin. Urine albuminous, with depression of spirits; headache, pain in the head and back, convulsions, thickly-coated tongue, dyspepsia, nausea; especially useful when associated with derangements of the liver and general anæmia.

Eupatorium perfoliatum. Nephritis of malarial origin, especially when associated with the characteristic chill, fever, and great pain in the bones.

Ferrum muriaticum. Urine copious, reddish; specific

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gravity varying from 1005 to 1025; loaded with blood corpuscles; copious, with whitish sediment; copious, with prostration and nervousness; constant urging to urinate, with pain in the chest, liver, and region of the kidneys; pain in lumbar region, relieved by walking, worse after sitting; chronic Bright's disease; fatty degeneration of the kidneys; albuminuria. It is indicated in proportion as the hepatic, digestive and assimulative functions are normal, and the elimination of albumen is independent of recent congestion or inflammation; it is beneficial in the enfeebled action of the heart, especially in chronic or sub-acute interstitial nephritis; it reduces the amount of albumen, epithelium, etc. It is indicated in those who are much debilitated, especially when the face is pale and flushes easily.

Ferrum phosphoricum. Urine pale and copious.. It is useful in chronic Bright's disease, diminishing the secretion of albumen.

Formica rufa. Urine albuminous and bloody, with much urging to urinate.

Glonoinum. Urine copious, albuminous and high-colored; polyuria, with very low specific gravity, great arterial tension, and violent action of the heart; it has acted kindly in puerperal convulsions occurring during labor; face bright red and puffy, pulse full and hard, frothing at the mouth, patient unconscious, hands clenched, with thumbs in the palms; cerebral hyperæmia, pain in head, aggravated

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by shaking the head or moving the body, relieved by external pressure; sensation of tension, throbbing, etc., in the heart. It acts kindly in uræmic dyspnœa.

Graphites. Urine ill-smelling, dense, deposits a thick white sediment; urine covered with an irridescent film, or has a sour odor; pain in the sacrum and coccyx on urinating.

Hamamelis Virginica. Urine bloody; back feels as though it would break.

Helleborus niger. Urine dark, scanty and smoky; containing blood, depositing on standing a sediment looking like coffee grounds; congestion of the kidneys with frequent urging to urinate with anasarca and ascites; dropsy following scarlet fever; suppression of the urine; torpor predominates; blunting of the general sensibilities; eyes do not re-act to light, or while the patient sees imperfectly he does not regard the objects seen, hardly remembers what he sees or hears; takes no pleasure in anything; corrugation of the muscles of the forehead; slow pulse with rapidly developing dropsies; giddiness, stupor or excitement and restlessness; pupils dilated and squinting; pain in the head so violent that there is constant change of position; headache referred to the occipital region; dull pain, worse on stooping, extending from the neck to the vertex; stiffness and contractive pains in loins as if beaten; face swollen and puffy; nausea and vomiting; absence of thirst; convulsions with cold extremities. This remedy acts

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best in five-drop doses of the tincture in acute nephritis with sudden dropsies; urine scanty and albuminous; it is frequently called for in nephritis following scarlet fever. The secondary effect of Helleborus is an increased secretion of urine, which is voided without urging.

Helonias dioica. Urine copious, finally becoming scanty, light-colored, urea increased, specific gravity lowered; pain over the kidney region, with suppression of the menses, congestion of the kidneys, and albuminuria; phosphates increased; urine turbid and scanty, frequent micturition, with weakness and great restlessness; stupid, depression of spirits, loss of appetite, easily fatigued, debility, emaciation, tired feeling; nephritis of pregnancy; pain and weight, with a sensation of burning in the region of the kidneys. All symptoms are relieved by motion.

Hepar sulphuris calc. Urine dark-red, hot, becomes thick, turbid, and deposits a white sediment on standing. It has been especially useful in post-scarlatinal nephritis, where there is a large quantity of mucus and epithelia deposited in the urine.

Hydrangea arborescens is a valuable and important remedy for renal colic, gravel, and as a uric acid solvent. In a large number of cases where it was given for some months without special diet there was no return of the trouble. It causes the excess of urates and white amorphous salts to disappear from the urine. It should be given in seven-drop doses of the fluid extract in a little water, four times daily.

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Hydrocyanicum acidum. Uræmic convulsions; convulsions, with drawing backward of the head; respiration irregular and gasping, great distress about the heart, fainting spells, with coldness and blueness of the surface of the body.

Ignatia amara. Urine lemon-colored, with white sediment; frequent discharge of watery urine; pressure to urinate after drinking coffee.

Ipecacuanha. Hæmaturia; hemorrhage from the kidneys, attended with nausea and vomiting, with cutting pains in the renal region, especially after the abuse of quinine.

Kali bichromicum. Urine scanty, reddish, high-colored and hot; suppression of the urine, with pain in the region of the kidneys. In animals poisoned with this drug the kidneys are found greatly congested, and the tubular portion softened and undistinguishable from the rest of the kidney tissue; the urine is purulent, or suppressed.

Kali carbonicum. Urine dark and turbid, loaded with urates; weak, lame feeling in the small of the back, with great exhaustion of the muscular system; aggravation of all symptoms from 3 to 4 A. M., and from cold.

Kali chloricum. Urine bloody, scanty, albuminous; acute nephritis.

Kali hydroiodicum. Urine dark and scanty, with a dirty yellowish sediment, or copious and clear; urea diminished; thirst, with heat in the head; useful in sub-acute and chronic nephritis of specific origin with

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darting pains in the region of the kidneys; feeling as if the small of the back was being squeezed in a vise; burning pain in the lumbar region, with difficulty in walking.

Kalmia latifolia. Urine yellow and copious, or diminished in quantity, feeling hot when voided; micturition frequent; pain in renal region, worse at night; pain in the cardiac region and excessive palpitation. Is especially useful in the sub-acute nephritis of pregnancy.

Lachesis. Urine dark, almost black, albuminous; the respiratory symptoms and all other conditions are worse after sleep; the blue condition of the œdematous surfaces are characteristic; dyspnœa on awakening, inability to lie down; drawing pains in the back extending to the hips or up the back. This remedy may be called for in the nephritis of scarlet fever and diphtheria.

Lithium carbonicum. Urine red, scanty, turbid, with reddish-brown sediment; albuminuria, with frequent urination, accompanied by great debility and especially an over-acid condition of the stomach.

Lycopodium clavatum. Urine turbid, with red sandy deposits; lithæmia, colic with pain on the right side, urine dark and burning; urine of strong odor, suppressed, sometimes copious; calculus with bloody urine; urine profuse, dark, bloody, with much red sandy sediment; greasy coating on the surface of the urine; red sand on child's diaper; before micturition the child screams with pain; urine turbid, milky,

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with a thick purulent sediment and offensive odor; pressing pain in perineum during and after micturition; urging to urinate, must wait some time before he can void it; frequent desire to urinate with scanty flow; terrific pain in the back before urination, relieved as soon as the flow begins; smarting and burning when urinating; drawing, cutting pain through to the abdomen; pain in the kidney and bladder with frequent urination; renal colic from the passage of small calculi, the pain is burning and cutting in character; useful in chronic Bright's disease with anasarca and the characteristic digestive disturbances; dropsies of the lower half of the body; the upper part, arms and chest emaciated; abdomen and leg swollen, œdematous, covered with ulcers from which serum oozes; all symptoms worse from 4 to 8 P. M.

Mercurius corrosivus. Urine copious, afterwards thick, scanty, bloody, and acid in reaction; it has caused complete suppression; urine albuminous, containing granular and fatty casts with epithelia from the tubuli uriniferi; the general firmness of the tissue of the body disappears; skin earthy, pale; eyelids and ankles œdematous; loss of appetite, quick and frequent pulse, great weakness and prostration, disposition to perspire on the slightest exertion, lassitude and soreness, great restlessness in the limbs, must change position constantly; sleepiness during the day, but not relieved by long sleep; sleep at night disturbed, awaking with dreams which terrify; dullness in the forehead; aching and weariness in the back

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of head and neck; sensation as if a band was tied around the head; qualmishness, weakness and tenderness in the epigastric region; nephritis complicating pregnancy; suppurative nephritis; inflammation of the kidneys, with scanty albuminous urine, frequent urination and pain in the back; in acute nephritis, the albumen, blood and œdema rapidly disappear under this remedy.

Mercurius dulcis. Is often required in interstitial nephritis.

Nux vomica. Urine pale, containing thick, white mucus or purulent matter; dark urine, depositing a red brick-dust sediment; bloody urine; nephritis, accompanied by digestive disturbances; vomiting, of renal origin; nausea after eating; thirst, polyuria; patient irritable, sullen, with desire to be alone, and to recline and keep quiet, etc.

Ocimum canum. Urine red, with brick-dust sediment and blood; saffron-colored urine; turbid urine, depositing a white albuminous sediment; burning during micturition; pain in ureters, and deposit in urine of a large quantity of red sand; renal colic; gravel; cramping pain in the kidneys, especially in the right; renal colic, with micturition every fifteen minutes, the pain causes the patient to wring his hands, moan and cry.

Opium. Urine red, scanty and cloudy, or lemon-colored, with a reddish sediment; indicated in uræmic coma from contracted kidneys; morphia, in ¼ to 1 grain doses hypodermically, has been successfully used in uræmic convulsions.

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Petroleum. Urine dark yellow, bloody and turbid, containing brown clouds after standing; odor offensive, sour, ammoniacal; urine suppressed during the day, copious at night; urine albuminous, containing granular and hyaline casts; urine has a reddish sediment, and is covered with a glistening film; useful in chronic nephritis with gastric symptoms and dropsy, also in renal hemorrhage, with pain in the renal region; chilliness, frequent micturition, and œdema of the lower extremities.

Phosphorus. Urine thick, turbid and scanty, containing blood corpuscles and albumen; urine brown, with red sandy deposit; urine bloody; it may be pale, watery, or whitish like curdled milk, containing fatty and waxy casts, pus and blood corpuscles; specific gravity diminished; acute pain in the region of the kidneys and liver, with jaundice; urine covered with an irridescent fatty matter; especially useful in fatty and amyloid degeneration of the kidneys when associated with similar pathological conditions of the liver and the right heart; venous stasis; œdema of the lungs; weakness of memory; difficulty in concentrating the mind; vertigo; confusion in head; weak, empty feeling in the whole abdomen; especially indicated in tall, slender individuals.

Phytolacca. Urine dark red, mahogany colored, with painful micturition; pain and soreness in right renal region; has been beneficial in chronic nephritis.

Pichi. Urine bloody, epithelial, granular or waxy casts; acute nephritis.

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Pilocarpin muriaticum. One-fourth to one-third grain doses of the hydro-chlorate hypodermically three times a day has been followed by profuse sweating and lowering of the temperature. In a case reported of convulsions in puerperal nephritis with complete anuria and face and body highly œdematous, the convulsions ceased with the re-establishment of the urinary secretion, and recovery followed.

Plumbum metallicum. Urine scanty and dark; albuminous, not accompanied by general œdema; urine brownish-red, turbid, sediment containing blood corpuscles, casts and albumen in abundance; has been useful in acute nephritis with mental depression and bloody urine, but is especially indicated in chronic granular gouty or cirrhotic kidneys with amaurosis, depression of spirits, cachexia, numbness of the lower extremities and dropsy. It has been found to diminish the quantity of albumen; uric acid is diminished; cerebral symptoms; clonic spasms of the face and limbs, slight dropsy, little albumen, with a marked tendency to uræmic convulsions; small granular contracted kidney and albuminuria is found in a large percentage of patients with lead poisoning; in chronic lead poisoning it causes interstitial nephritis, atrophy of the kidney, adhesion of the capsule, and the formation of small cysts in the substance of the kidney; the tubule uriniferi are first affected, with proliferation of the epithelia and formation of casts; it involves both the cortical and medullary portions of the kidney, but some parts are usually more affected than others, and many

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symptoms similar to gout are developed while the chronic poisoning is going on.

Pulsatilla. Urine bloody, reddish; mucous, jelly-like, slimy deposit which sticks to the chamber; brick-dust sediment; suppression of the urine with the general symptoms of this remedy; spasmodic pain at the neck of the bladder extending to the pelvis and thighs; frequent and almost ineffectual urging to urinate; involuntary urination at night in bed; constant pressure in the bladder with frequent desire to urinate; the urine is discharged while walking or standing.

Rhus toxicodendron. Urine dark, turbid and scanty; has been useful in acute nephritis with cutting pains in the back, general œdema resulting from exposure to wet; great œdema of the legs, with ulcers exuding serum.

Sabina. Urine red and scanty, bloody, albuminous; strangury; dragging pains in the back extending to the pelvic region and thighs in rheumatic and arthritic subjects.

Sandal wood. Urine albuminous, associated with great pain in the lumbar region; acute nephritis.

Sarsaparilla. Urine copious, clear, scanty and slimy; clay-colored and scanty; sand in the urine or on the diaper; child screams before and during micturition; the urine contains pus, blood and mucus; fiery red, turbid urine containing long flakes; urine excoriating; pain in the lumbar region going forward; abdomen distended; severe tenesmus; painful constriction of the bladder; micturition frequent and in-

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effectual, ending by passing blood; chills run from the bladder to the back; gravel passes after urinating; has to get up in the night frequently to urinate; retention of urine.

Secale cornutum. Urine has a cheesy sediment; has been used in post-scarlatinal nephritis.

Senecio aureus. Urine scanty and bloody; inflammation of the kidneys with renal dropsy and pain in the kidney region resulting from or following the passage of a urinary calculus; sometimes useful in œdema of the lungs accompanying croupous nephritis; dyspnœa on ascending the stairs.

Senna. Excess of urea, chloride of sodium and phosphates in the urine.

Sepia. Urine thick, slimy, offensive, depositing a yellowish, pasty sediment; urine turbid, clay-colored; urine turbid and dark when passed, as if mixed with mucus; on standing it deposits a white or reddish sediment and becomes offensive; deposit of brick-dust sediment, uric acid, bile pigment, blood, etc.; fetid urine, with reddish, clay-colored sediment adhering to the chamber; the urine is so offensive that it must be removed at once; the discharge of mucus in the urine does not take place every time the urine is passed, but occurs periodically; urine dark, turbid, and mixed with pus; thick, slimy, turbid and offensive, depositing a pasty sediment; the lower part of the abdomen feels distended, with tension and soreness; frequent, painful, and ineffectual urging to urinate, until long effort and waiting have about tired out the

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sufferer; desire to urinate, with bearing down in the pelvis; burning and cutting when urinating; chill and heat in the head during and after micturition; pulsation in the small of the back; sprained pain over the hips; pain in the lumbar region; deep-seated pressive pain and tension in the lumbar region; gravel; pyelitis.

Stigmata maidis. Retention of urine; renal colic; gravel; acute and chronic cystitis; vesical tenesmus and irritation; pyelitis.

Stramonium. Suppression of urine, with the characteristic mental symptoms.

Sulphur. Urine clear, high-colored or turbid, of penetrating odor, with thick deposit, which sticks to the chamber; retention of urine; urinates frequently, with a feeling of obstruction at the neck of the bladder and a sense of pressure and distention; bruised sensation in small of back after micturition; the pains continue in the urethra until the urging to urinate returns; increased secretion of urine; frequent urination at night; the desire comes suddenly, is imperative, and if not gratified at once micturition becomes involuntary; pyelitis; constant urging to urinate day and night, in a thin stream or drop by drop.

Terebinthina. Urine bloody, scanty, smoky, with a coffee ground deposit, the sediment consisting of disintegrated blood corpuscles and casts; dull, burning pains in kidneys, especially from the right kidney to the hip; burning during micturition; urine dark, cloudy, smoky, containing albumen; pressure from the bladder to the kidneys, relieved when walking;

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acute or chronic nephritis from cold or malaria. It causes active congestion of the capillary of the malpighean tufts and glomeruli, exudation of blood and albumen, and destruction of the epithelium of the tubuli uriniferi; renal hyperæmia and congestion, hæmaturia; suppression of urine; uræmia is rare. It is often indicated in dropsy after scarlet fever, but more frequently when resulting from colds and when congestion is more marked than the evidence of change in the epithelium of the tubules would seem to warrant; its first effect is to make the urine more copious; dyspnœa, patients must be propped up in bed; tongue dry and glossy; stupor and great weakness.

Ulex diureticus. This drug produces marked diuresis; it should not be used with a weak heart or when the nephritis is acute; it increases blood pressure by irritation of the vaso-motor system; its action is rapid and transitory; dose twenty to forty drops every three or four hours.

Uva ursi. Urine milky, slimy, yellow, purulent and bloody, or red, scanty, high-colored and acid; painfulness and soreness in the region of the kidney; uneasy feeling in the left thigh with frequent desire to urinate; the stream is small, and the bladder is emptied only with considerable effort; pain and soreness in the left groin; heavy pain in the lumbar region, and uneasiness in the bladder; frequently required in pyelitis.

Zingiber. Suppression of urine; incessant micturition; strangury; urine scanty, bloody and albuminous, with other symptoms of acute nephritis.

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